

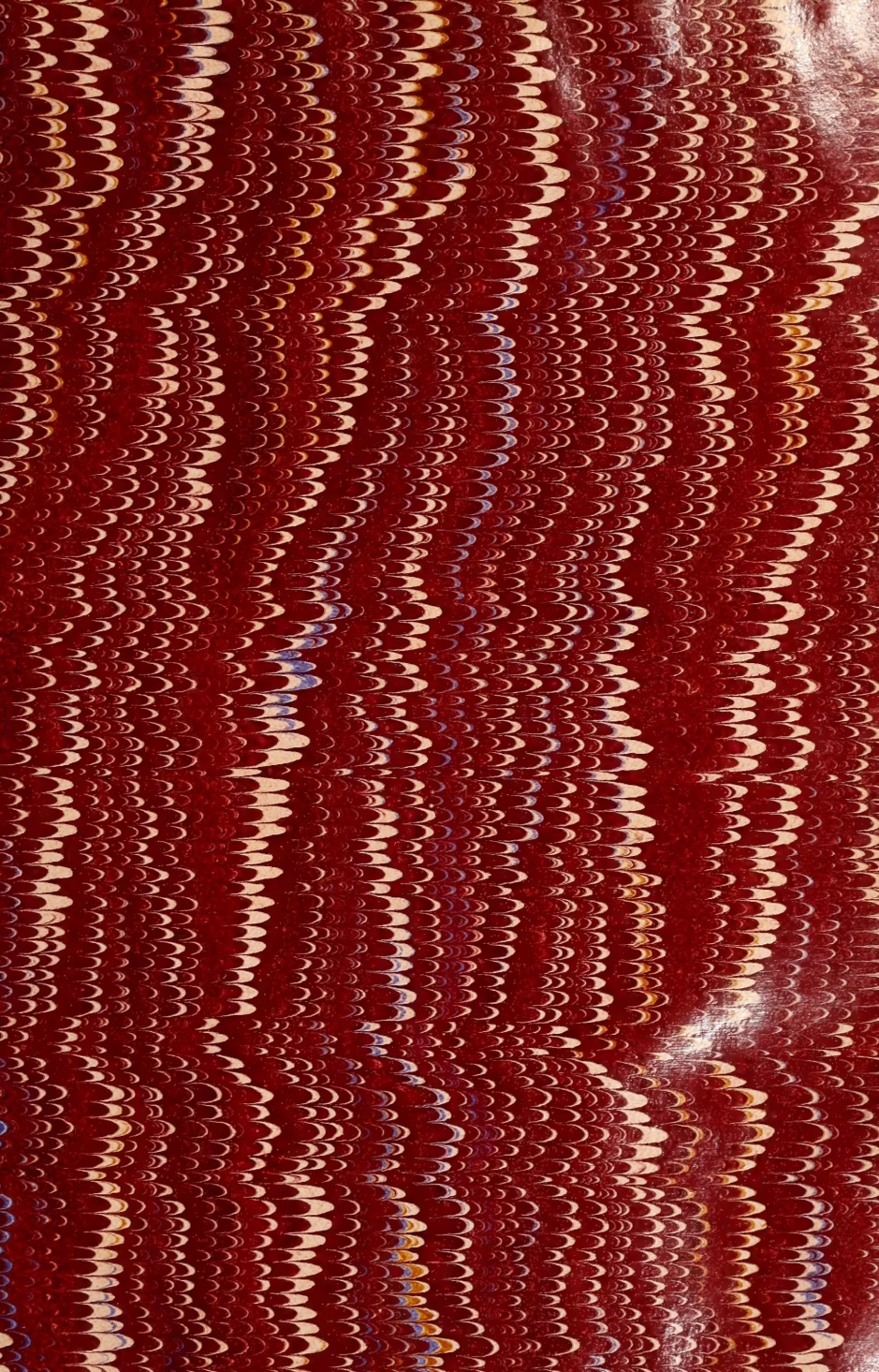


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The Scottish Medical and Surgical Journal

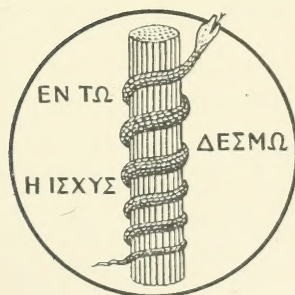
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ALEXANDER MILES & J. S. FOWLER

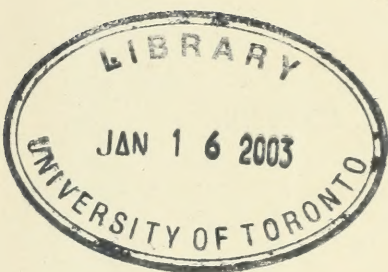
NEW SERIES

VOL. IX



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MEDICAL EDUCATION IN SCOTLAND.

A CANDIDATE desirous of obtaining a legal qualification to practise medicine must conform to the Regulations of the General Medical Council, which require (1) that the candidate must first pass a preliminary examination; (2) must register as a medical student; (3) must study for at least five years at a school recognised by the General Medical Council; (4) must obtain a degree or diploma recognised by the Council; and (5) must enter his name on the official list of medical practitioners, the *Medical Register*. No person whose name does not appear on the *Medical Register* may legally sign certificates, give medical evidence in Court, or sue for fees.

Provided these Regulations are conformed to, the candidate has a wide choice of medical schools, and may proceed to take either a University degree or a diploma of the other licensing bodies. Those available in Scotland are as follows :—

Degrees.—The Scottish Universities confer the degrees of Bachelor of Medicine and Bachelor of Surgery (M.B., Ch.B.) on candidates who have attained the age of twenty-one. These degrees admit to the *Medical Register*. The higher degrees, Doctor of Medicine (M.D.), Master of Surgery (Ch.M.), may be registered as additional qualifications.

Diplomas.—The Royal College of Physicians of Edinburgh, the Royal College of Surgeons of Edinburgh, and the Royal Faculty of Physicians and Surgeons of Glasgow co-operate in conducting Examinations for the *Triple Qualification* (L.R.C.P.E., L.R.C.S.E., L.R.F.P.S.G.), which admits to the *Medical Register*. Like the higher degrees of the Universities, the Fellowships and Licences of any of these corporations may be registered as additional qualifications.

Special degrees and diplomas are granted to qualified persons in the department of public health.

THE UNIVERSITIES.

PRELIMINARY EXAMINATION.—Each student must pass this examination before commencing medical study. At the matriculation office of each University, candidates can obtain schedules, which must be filled up and lodged not later than certain dates in March and September respectively. The fee for examination is 10s. 6d., and should be paid at the time of lodging the schedule. Candidates are examined on the following subjects :—

1. *English.*—A single three hours' paper will be set, containing an Essay, a Paraphrase, two questions on History, two in Geography, four on Grammar (including Correction of Sentences, Parsing, Analysis of Sentences, and Derivations), two of a literary and general kind. Eight answers will be required. The Essay, the Paraphrase, one answer in History, and one in Geography are compulsory.

2. *Latin.*—Translation, Parsing, Grammar, Prose Composition, and Sentences.

3. *Elementary Mathematics.*—(a) Arithmetic (fractions, proportion, percentage, square root, and simple interest); (b) Algebra (fractions, factors, square root, equations of the first degree, simultaneous equations of the first degree, quadratic equations and problems leading thereto); (c) Geometry (Euclid, Books I., II., and III., or their equivalents, with simple deductions).

4. *Greek, French, German, or Italian.*

French or German.—Grammar, translation into English and into French or German, and short idiomatic sentences for translation from English.

Greek.—Grammar, translation into English, and of short sentences into Greek.

In the case of a candidate whose native language is not English, an examination in the native language of the candidate may be substituted for one in either French or German, and an examination in any other classical language for one in Latin or Greek.

It is compulsory that the subjects be passed at not more than two examinations, but there is no restriction on the number of times the candidate may present himself for examination. A degree in Arts or Science in any University of the United Kingdom, and in any Colonial or Foreign University specially recognised; the Lower Grade Leaving Certificate of the Scottish Education Department, and certain other examinations, are accepted as equivalents for the preliminary examination. The preliminary examination conducted by the Educational Institute of Scotland is not accepted as an equivalent examination.

MATRICULATION.—Having passed the preliminary examination, the student must, within fifteen days after the commencement of the session, make the required entries in the Matriculation Album of the University, and pay the matriculation fee, which is one guinea for the whole year, half a guinea for the summer session alone. The student must matriculate each year of study.

REGISTRATION.—Within fifteen days after commencement of study, he must register as a medical student. He must be not less than sixteen years of age, must have passed the preliminary examination, and must produce to the Registrar (James Robertson, Esq., 54 George Square, Edinburgh) an application form duly filled up, showing that he has commenced medical study.

THE CARNEGIE TRUST.—This Trust is prepared to pay the class fees of students (who have passed the specified preliminary examination) for all classes, whether attended within the Universities or in any of the Extra-Mural Schools. The Trust is also prepared to pay the class fees for students proceeding to the Triple Qualification, provided that the applicant has passed the preliminary examination recognised by the Trust. It is also prepared to pay the fees for the various special classes given by many of the Lecturers upon advanced and non-compulsory subjects. Three qualifications are demanded: the applicant (1) must be over sixteen years of age; (2) must be of Scottish birth or extraction, or must have given two years' attendance after the age of fourteen at a school or institution under inspection of the Scottish Education Department; and (3) must be qualified by preliminary examination under the ordinances of the Scottish Universities Commission and the regulations of the Joint Board of Examiners, to attend the classes for which payment of fees has been claimed. Schedules of application for admission to the benefit of the Trust are obtainable by written application to the Secretary of the Trust, 14 Hanover Street, Edinburgh.

PROFESSIONAL EDUCATION AT THE UNIVERSITIES.

The rapid growth of medical science in recent years has been reflected by an increase in the amount of study required of the student. New classes have been added, and the problem of including these without lengthening the five years' curriculum has received much attention from medical educationalists.

The following order of study is recommended :—

FIRST YEAR.

Winter—

Practical Chemistry (twice weekly). Anatomy. Chemistry.
Physics. Practical Anatomy (thrice weekly).
Examination in Chemistry and Physics.

Summer—

Botany.	Zoology.
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Practical Botany } On alternate days. Practical Anatomy.
Practical Zoology }

Examination in Botany and Zoology.

SECOND YEAR.

Winter—

Physiology. Practical Physiology (twice weekly).
Practical Anatomy and Demonstrations.

Summer—

Histology. Practical Anatomy and Demonstrations.
Examination in Anatomy and Physiology.

THIRD YEAR.

Winter—

Practical Materia Medica. Surgery. Clinical Surgery.
Materia Medica. Pathology.

Summer—

Practical Pathology. Post-Mortem Examinations and Hospital
Practice. Vaccination.
Examination in Pathology and Materia Medica.

FOURTH YEAR.

Winter—

Medicine.	Midwifery and Gynecology.	Clinical Medicine.
Dispensary Practice	} (January-March).	
Practical Midwifery		

Summer—

Operative Surgery. Public Health. Diseases of Children.
Hospital Practice. Forensic Medicine.
Mental Diseases, } (twice weekly).
Infectious Diseases

Examination in Forensic Medicine and Public Health.

FIFTH YEAR.

Winter—

Ophthalmology. Diseases of Ear, Nose and Throat. Diseases of Skin.
Clinical Medicine, Clinical Surgery, and Clinical Gynecology.
Anæsthetics. Dispensary Practice. Practical Midwifery.

Summer—

Clinical Work in Hospital.
*Examination in Midwifery, Medicine, and Surgery, and corresponding
 Clinical Examinations.*

Medical Education in Scotland

B.—For Students Beginning in Summer.

FIRST YEAR.

Summer—

Botany. Zoology.
 Practical Botany }
 Practical Zoology } On alternate days.
 Practical Anatomy (thrice weekly).
Examination in Botany and Zoology.

Winter—

Practical Chemistry (twice weekly). Anatomy. Chemistry.
 Physics. Practical Anatomy.
Examination in Chemistry and Physics.

SECOND YEAR.

Summer—

Histology. Practical Anatomy.

Winter—

Physiology. Practical Physiology (twice weekly).
 Practical Anatomy and Demonstrations.
Examination in Anatomy and Physiology.

THIRD YEAR.

Summer—

Practical Pathology. Practical Materia Medica.
 Hospital Practice and Post-Mortem Examinations. Vaccination.

Winter—

Surgery. Clinical Surgery. Materia Medica. Pathology.
Examination in Pathology and Materia Medica.

FOURTH YEAR.

Summer—

Ophthalmology. Diseases of the Skin.
 Clinical Medicine. Mental Diseases.

Winter—

Medicine. Midwifery. Clinical Medicine.
 Infectious Diseases. Diseases of Ear, Nose, and Throat.

FIFTH YEAR.

Summer—

Operative Surgery. Public Health. Diseases of Children.
 Hospital Practice. Forensic Medicine. Dispensary Practice.
Examination in Forensic Medicine and Public Health.

Winter—

Practical Midwifery. Clinical Medicine. Clinical Surgery. Clinical
 Gynecology, and Anæsthetics. Dispensary Practice.

SIXTH SUMMER.

Clinical Work in Hospital.
*Examination in Midwifery, Medicine, and Surgery, and Corresponding
 Clinical Examinations.*

The candidate must attend Hospital for not less than three years; must attend both Clinical Medicine and Clinical Surgery for a period of at least nine months; twenty cases of Midwifery, or twelve cases and three months' attendance at a Maternity Hospital; and Post-Mortem Examinations for three months.

It is required that, before commencing the study of Practical Midwifery, every student shall have held the offices of Clinical Medical Clerk and Surgical Dresser, and have attended a Course of Lectures on Surgery and Midwifery.

Two of the five years of study must be spent at the University, and not less than eight of the compulsory subjects of study must be taken in the University.

The minimum expense of M.B. and Ch.B., including fees for Classes, Hospital, Matriculation and Examination, amounts to about £143.

The University degrees are conferred on women students.

A complete curriculum is given by the School of Medicine for Women, Surgeons' Hall.

DEGREE OF M.D.

Each candidate for this degree, under the New Regulations, must be of the age of twenty-four years or upwards, and must have obtained the degrees of M.B. and Ch.B. of the University. He must either have been engaged for two years in general practice, or for one year in the naval or military medical services, or in the medical wards of a hospital, or in scientific research. He must present a thesis written by himself on a medical subject, and pass an examination in Clinical Medicine. In this examination the candidate has to write a report and commentary on at least three cases, and has to show a practical knowledge in the application of the ophthalmoscope, laryngoscope, electrical apparatus, and sphygmograph, in the examination of the blood, and in the chemical and microscopical examination of the excreta.

The candidate who has graduated M.B. and Ch.B. under the old regulations may either proceed to the degree of M.D. under the old regulations, (under which he is not required to pass an examination in Clinical Medicine, but must have passed examinations in Greek and in Logic or Moral Philosophy), or he may proceed to the degree as if he had graduated M.B., Ch.B. under the New Regulations.

DEGREE OF CH.M.

Each candidate must be not less than twenty-four years of age, must possess the degrees of M.B., Ch.B., must have attended the surgical wards of a hospital for one year, or have spent one year in scientific research or in the naval or military medical services, or two years in practice other than that restricted to medicine. He must submit a thesis on a surgical subject, and pass an examination on Clinical Surgery and its branches, Surgical Anatomy, and Operations on the Dead Body.

FEES FOR M.D. AND CH.M.

The fee for the M.D. degree under the old regulations is five guineas; for the M.D. or Ch.M., under the New Regulations, ten guineas. The candidate must have paid the matriculation fee for the year in which he presents himself for examination or graduation. At each reappearance for examination, under the New Regulations, the fee is five guineas.

DEGREES IN PUBLIC HEALTH.

Two degrees are granted by the University of Edinburgh in the department of Sanitary Science, viz. B.Sc. and D.Sc.

BACHELOR OF SCIENCE.

Candidates must be graduates in Medicine of a University of the United Kingdom or of some other recognised University. In order to obtain the degree two examinations have to be passed.

First Examination.—Before entering for this examination the candidate must, after graduating in Medicine, have worked in a recognised Public Health Laboratory for eight months, of which five consecutive months must be passed in the Public Health Laboratory of the University of Edinburgh.

He must also have attended in a Scottish University a course of lectures on Physics and a course of lectures on Geology, extending over three months, and approved of by the University Court.

The subjects of examination are as follows :—

- (1) *Laboratory work*—Practical, written and oral; examination of water, air, foods, beverages, condiments, sewage; soils; disinfectants; building materials; clothing; bacteriology.
- (2) *Physics.* (3) *Geology.*

Second Examination.—This cannot be taken until eighteen months after graduating in medicine; nor sooner than six months after passing the First B.Sc. Examination. The candidate must have attended two separate courses on Public Health, either in the University of Edinburgh or in some other recognised University or School.

Each course must consist of forty lectures, and include Medicine in its relation to Public Health and Sanitary Engineering.

The candidate must likewise produce evidence that (1) for six months he has studied sanitary work under a Medical Officer of Health for a county or burgh of not less than 25,000 inhabitants; (2) that he has studied clinically for three months infectious diseases in a recognised institution; (3) that for three months he has been instructed by a recognised teacher in mensuration and drawing.

The subjects of examination are :—

- (1) Sanitation; (2) Sanitary Law; (3) Vital Statistics; (4) Medicine in Relation to Public Health.

The candidate is examined orally, practically, and by a written paper. *Sanitation* includes making reports on dwellings, workshops, hospitals and sanitary schemes.

The University Court may modify the work and instruction prescribed from time to time.

DOCTOR OF SCIENCE.

A graduate after having held the degree of B.Sc. for five years may present himself for the D.Sc. He must present a thesis or a published work or memoirs, the result of his own research, and must pass an examination in Public Health, and in such of its special subjects as the Senatus may determine. The candidate must submit the subject in which he proposes to be examined for approval not less than two months before the examination.

FEES PAYABLE.—First and second examinations, £3. 3s. each; for D.Sc., £10. 10s.

INSTITUTIONS FOR CLINICAL INSTRUCTION IN EDINBURGH.

Royal Infirmary. 860 beds and 40 cots. Fees perpetual ticket, £12; one year, £6, 6s.; six months, £4, 4s.; three months, £2, 2s. Clinical instruction is given daily in Medicine, Surgery, and all their special branches.

Royal Hospital for Sick Children. 120 beds. Hospital ticket, £1. 1s. Fee for Qualifying Course, £2, 2s.

City Hospital for Infectious Diseases. 600 beds. Fee, £1, 1s.

Royal Maternity and Simpson Memorial Hospital. 40 beds. The Maternity Residency affords accommodation for twelve students.

Royal Asylum, Morningside. 500 beds.

The fee for a qualifying course at each of these last two institutions is £2, 2s.

Victoria Hospital for Consumption and Diseases of the Chest. 50 beds. Out-Patient Department at 26 Lauriston Place.

Eye, Ear and Throat Infirmary. 6 beds; 2700 Out-Patients yearly. Fee for three months, £1, 1s.

Royal, New Town, Medical Missionary (Cowgate), Western, Provident (Marshall Street), Eye, and Skin Dispensaries.

PROFESSORS AND LECTURERS IN EDINBURGH.

The Courses given by the Extra-Mural Lecturers are recognised by the University and other examining boards as qualifying for graduation.

Botany— Professor Bayley Balfour, M.D., Botanical Gardens.

James A. Terras, B.Sc., New School.

Zoology— Professor J. Cossar Ewart, M.D., University.

Malcolm Laurie, D.Sc., Surgeons' Hall.

Marion I. Newbigin, D.Sc., Surgeons' Hall.

Hugh Miller, F.Z.S., 29 George Square.

Biology— Malcolm Laurie, D.Sc., Surgeons' Hall.

Marion I. Newbigin, D.Sc., Surgeons' Hall.

Physics— Professor J. G. MacGregor, D.Sc., University.

C. G. Knott, D.Sc., University.

Dawson Turner, M.D., Surgeons' Hall.

Chemistry— Professor Walker, University.

G. H. Gemmell, F.I.C., 4 Lindsay Place.

T. W. Drinkwater, Ph.D., Surgeons' Hall.

Anatomy— Professor A. Robinson, M.D., University.

J. Ryland Whitaker, M.B., Surgeons' Hall.

Applied Anatomy—

H. J. Stiles, M.B., University.

J. Ryland Whitaker, M.B., Surgeons' Hall.

Physiology— Professor E. A. Schäfer, LL.D., University.

Alexander Goodall, M.D., Surgeons' Hall.

Materia Medica and Therapeutics—

Professor Sir Thomas R. Fraser, M.D., University.

William Craig, M.D., Surgeons' Hall.

Francis D. Boyd, C.M.G., M.D., New School.

John Orr, M.D., 27 Nicholson Square.

Pathology— Professor Lorrain Smith, M.D., University.

Theodore Shennan, M.D., Surgeons' Hall.

James Miller, M.D., New School.

Surgery— Professor Alexis Thomson, University.

J. W. Dowden, F.R.C.S., New School.

A. A. Scot Skirving, C.M.G., F.R.C.S., 27 Nicolson Square.

Henry Wade, F.R.C.S., Surgeons' Hall.

G. L. Chiene, F.R.C.S., Brighton Street.

J. W. Struthers, F.R.C.S., New School.

W. J. Stuart, F.R.C.S., 59 Forrest Road.

Lewis Beesly, F.R.C.S., Surgeons' Hall.

Clinical Surgery—

The Surgeons of the Royal Infirmary.

Practice of Medicine—

Professor J. Wyllie, M.D., University.

J. J. Graham Brown, M.D., New School.

Practice of Medicine—

- { Harry Rainy, M.D., 27 Nicolson Square.
- { R. A. Fleming, M.D., 27 Nicolson Square.
- G. Lovell Gulland, M.D., Surgeons' Hall.
- { Byrom Bramwell, M.D., New School.
- { Edwin Bramwell, M.D., New School.
- Edwin Matthew, M.D., Surgeons' Hall.
- A. Dingwall Fordyce, M.D., Dental Hospital.

Clinical Medicine—

The Physicians of the Royal Infirmary.

Midwifery and Gynaecology—

- Professor Sir J. Halliday Croom, M.D., University.
- D. Berry Hart, M.D., Surgeons' Hall.
- J. W. Ballantyne, M.D., Surgeons' Hall.
- A. H. F. Barbour, M.D., University and Royal Infirmary.
- J. Haig Ferguson, M.D., New School.
- W. Fordyce, M.D., New School.
- N. T. Brewis, F.R.C.S., Royal Infirmary.
- J. Lamond Lackie, M.D.
- E. M. Inglis, M.B.
- John M'Gibbon, M.B., 59 Forrest Road.
- G. F. B. Simpson, M.D., New School.
- H. S. Davidson, F.R.C.S.
- B. P. Watson, M.D., 27 Nicolson Square.

Insanity—

- G. M. Robertson, M.D., University and Royal Asylum.
- { Sir J. Baŕty Tuke, M.D., Surgeons' Hall.
- { John Keay, M.D., Bangour Village Asylum.

Diseases of the Eye—

- G. Mackay, M.D., Royal Infirmary.
- W. G. Sym, M.D., Royal Infirmary.
- A. H. H. Sinclair, M.D. (Ophthalmoscopy), 45 Lauriston Place.
- J. V. Paterson, M.B., Cambridge Street.

Vaccination—

- J. B. Buist, M.D., Western and Cowgate Dispensaries.
- W. G. Aitchison Robertson, M.D., D.Sc., Royal Dispensary.

Diseases of Children—

Staff of the Sick Children's Hospital.

Diseases of the Skin—

- Norman Walker, M.D., Royal Infirmary.
- Frederick Gardiner, M.D., Surgeons' Hall.

Diseases of the Ear, Nose and Throat—

- A. Logan Turner, M.D., Royal Infirmary.
- J. Malcolm Farquharson, M.B., Royal Infirmary.
- J. S. Fraser, M.B., Surgeons' Hall.

Forensic Medicine—

- Professor Harvey Littlejohn, F.R.C.S., University.
- W. G. Aitchison Robertson, M.D., D.Sc., Surgeons' Hall.
- John Macmillan, F.R.C.S., New School.

Public Health—

- Professor C. Hunter Stewart, M.B., University.
- W. G. Aitchison Robertson, M.D., D.Sc., Surgeons' Hall.
- Wm. Robertson, M.D., Surgeons' Hall.
- John Macmillan, F.R.C.S., New School.

Fevers—

- Alexander James, M.D., City Hospital.
- C. B. Ker, M.D., City Hospital.

Bacteriology—

W. E. Carnegie Dickson, M.D., University
 T. Shennan, M.D., Surgeons' Hall.
 J. Taylor Grant, M.D., 4 Lindsay Place.
 James Miller, M.D., New School.

Diseases of Tropical Climates—

Major D. G. Marshall, I.M.S., University and Surgeons' Hall.

Practical Medicine and Physical Diagnosis—

G. Lovell Gulland, M.D., Surgeons' Hall.
 R. A. Fleming, M.D., Nicolson Square.
 William Russell, M.D., Surgeons' Hall.

Neurology— J. J. Graham Brown, M.D., University.*Diseases of the Chest—*

R. W. Philip, M.D., 26 Lauriston Place.
 G. Lovell Gulland, M.D., 26 Lauriston Place.

Medical Electricity and Röntgen Rays—

Dawson Turner, M.D., Surgeons' Hall.

Diseases of the Blood—

G. Lovell Gulland, M.D., Surgeons' Hall.
 Alexander Goodall, M.D., Surgeons' Hall.

Practical Anæsthetics—

D. C. A. McAllum, University.

History of Medicine—

J. D. Comrie, M.D., University.

UNIVERSITY OF GLASGOW.

DEGREES OF M.B. AND CH.B.

Within recent years the facilities for both scientific and practical training have been much extended and improved. New and fully equipped laboratories have been added in connection with nearly all the scientific subjects, the most recent addition being a large building, just completed at a cost of £40,000, for the departments of Physiology, Materia Medica, and Public Health. There is a large and well-equipped Pathological Institute at the Western Infirmary in which the University Classrooms are placed, and the Professor of Pathology is *ex officio* Pathologist to the Infirmary, and has control of all the pathological material for purposes of instruction and investigation. A corresponding arrangement forms part of the new scheme just being completed with regard to the Royal Infirmary. The Western Infirmary is close to the University, and has hitherto been the chief field of clinical instruction of University students. A scheme has, however, been just carried through, according to which University Chairs, on the same footing as those already in existence, have been instituted at the Royal Infirmary in the subjects of Pathology, Medicine, Surgery, Midwifery, and Gynæcology. Students will thus have the option of taking the subjects of the two final years of study at the Royal Infirmary, and thus the advantage of a very wide clinical field along with systematic instruction under University Professors. The great disadvantage of attending classes at Gilmourhill and going to the Royal Infirmary, at a considerable distance, for clinical work will thus be done away with.

The latest development is the institution, at the Western Infirmary, of a Laboratory for Clinical Pathology, the Director of which will also be a University Lecturer and will give instruction to University students in the scientific methods of clinical diagnosis.

Under the New Ordinance of the University Court, which came into operation on 1st October 1911, the regulations for these Degrees (except in regard to the Preliminary Examination) have been considerably altered, the

chief modifications being as follows:—1. A rearrangement of the subjects of the four Professional Examinations. 2. The rendering compulsory of some courses which hitherto have been optional. 3. The imposition of restrictions as to the period at which certain subjects of the curriculum can be taken.

The academical year is now divided into three terms of about ten teaching weeks each, and the following list gives the subjects of the several Professional Examinations, with the period of study required:—

FIRST EXAMINATION.

Chemistry (including Organic Chemistry), 2 terms : with Practical Chemistry, 1 term.

Physics (with practical work), 1 term.

Botany (with practical work), 1 term.

Zoology (with practical work), 1 term.

SECOND EXAMINATION.

Anatomy and Practical Anatomy, 5 terms.

Physiology and Practical Physiology, 3 terms.

THIRD EXAMINATION.

Materia Medica and Therapeutics, 2 terms.

Pathology and Practical Pathology, 3 terms.

FOURTH EXAMINATION.

Medical Jurisprudence and Public Health, 2 terms.

Surgery, 2 terms.

Practice of Medicine, 2 terms.

Midwifery and Diseases Peculiar to Women and Infants, 2 terms.

The candidate must have attended the Medical and Surgical practice of a general hospital for three years, and courses of Clinical Surgery and Clinical Medicine of nine months in each case. He must also have received instruction, under conditions laid down, in the following subjects:—

Mental Diseases.

Practical Pharmacy.

Out-Patient Practice.

Clinical Clerking in Medicine.

Clinical Clerking or Dressing in Surgery.

Post-Mortem Examinations.

Infectious Diseases.

Gynæcology.

Diseases of Children.

Ophthalmology.

Diseases of the Ear and Throat.

Dermatology.

Practical Midwifery with the Conduct of Cases of Labour.

Vaccination.

Administration of Anæsthetics.

Operative Surgery.

The following courses cannot be taken till after the end of the terms of the curriculum indicated in each case:—

Physiology and Practical Physiology—third term, and not (except Practical Histology) till at least two of the subjects of the First Examination have been passed.

Materia Medica and Therapeutics and Pathology and Practical Pathology—sixth term.

Medical Jurisprudence and Public Health—eighth term.

Midwifery, etc., Surgery and Medicine—ninth term, with the exception that Surgery may be attended after the sixth term, provided that the candidate has passed the Second Professional Examination.

Hospital Practice, Clinical Medicine, Clinical Surgery—sixth term.

The curriculum extends over five years, two of which must be spent in the University of Glasgow. The remaining three years may be spent elsewhere, as indicated in the Ordinance and under the conditions thereby imposed.

Except in the case of Medicine, Surgery, and Midwifery, the Senate may accept the Professional Examinations of other Scottish Universities.

There are a number of other administrative regulations which need not here be specified in detail.

The examination fees are £23, 2s. in all, with an additional fee of £1, 1s. for every re-entry. The cost of the curriculum amounts roughly to £145, spread over the five years of the course, and at present the class fees are charged at so much a class. There is, however, a movement on foot to introduce a "composition" or "inclusive" fee per session, but the total will work out at practically the above figure.

CLINICAL FACILITIES.

The following general hospitals, all of which are equipped in a modern fashion, are available for instruction of University Students, viz. the Western Infirmary close to the University and the Royal Infirmary, to which the new Medical Chairs will be attached, each of these having at present about 600 beds, and the Victoria Infirmary, with 260 beds, on the south side of the city.

The Eye Infirmarys at 174 Berkeley Street and 80 Charlotte Street (between them 100 beds), and the Ophthalmic Institution at 126 West Regent Street (35 beds), furnish ample opportunities for instruction in the important branch with which they deal; Insanity is equally well provided for at Gartnavel (of which the University Lecturer on that subject is Superintendent—460 beds), at Gartloch (806 beds), and at Woodilee (1160 beds), while the City Fever Hospitals at Ruchill (540 beds) and Belvidere (680 beds) are available for the study of Zymotic Diseases. The Ear, the Throat and Nose, and the Skin are dealt with in the Western Infirmary.

A new Maternity Hospital, with every modern convenience and equipment, was recently opened in Rottenrow, with accommodation for 104 patients, and an Hospital for Sick Children, of greatly increased dimensions, in freer air, is in course of erection at Yorkhill within a short distance of the University, which will take the place of the existing building in Scott Street (74 beds). The beds at Yorkhill will number 200.

The Ordinance is applicable alike to men and women students, and much of the instruction is given in "mixed" classes by the Professors. There are, however, exceptions to this, some classes for women alone being held in a separate building (Queen Margaret College), and some for both sexes (in the main buildings at Gilmorehill) at different hours. The Hospital work in the case of women has hitherto been taken entirely in the Royal Infirmary, there being no accommodation for them in the Western. This arrangement is likely to continue.

PROFESSORS.

Zoology— Professor Graham Kerr, M.A., F.R.S.

Chemistry— Professor Ferguson, M.A., LL.D., F.S.A.

Practical Physics—

Professor Gray, M.A., LL.D., F.R.S.

Botany— Professor Bower, D.Sc., F.R.S.

Anatomy— Professor Bryce, M.A., M.D.

Physiology— Professor Noël Paton, B.Sc., M.D.

Materia Medica and Therapeutics—

Professor Stockman, M.D.

Pathology— Professor Muir, M.A. M.D., F.R.S.

Medical Jurisprudence and Public Health—

Professor Glaister, M.D., D.P.H.(Camb.).

Surgery and Clinical Surgery—

Professor Sir William Macewen, M.D., LL.D., D.Sc., F.R.S.

Midwifery— Professor Murdoch Cameron, M.D.

Practice of Medicine and Clinical Medicine—

Professor Gemmell, M.D.

Public Health—

Professor Glaister, M.D., D.P.H.(Camb.).

Pathology— Professor John H. Teacher, M.A., M.D.

Medicine and Clinical Medicine—

Professor Walter K. Hunter, D.Sc., M.D.

Surgery and Clinical Surgery—

Robert Kennedy, M.A., D.Sc., M.D.

Midwifery—

John M. Munro Kerr, M.D.

LECTURERS.

Organic Chemistry—

T. S. Patterson, Ph.D., D.Sc.

Physiological Chemistry—

E. P. Cathcart, M.D., D.Sc.

Psychological Physiology—

Henry J. Watt, M.A., Ph.D.

Public Health—

Professor Glaister, M.D., D.P.H.(Camb.).

Ear—

Thomas Barr, M.D.

Throat and Nose—

James Walker Downie, M.B.

Skin—

John Wyllie Nicol, M.B.

Clinical Pathology—

Carl H. Browning, M.D.

Bacteriology—

W. B. M. Martin, M.D.

Physics—

James G. Gray, D.Sc.

Embryology—

James F. Gemmill, M.A., D.Sc., M.D.

Insanity—

Landel R. Oswald, M.B.

DEGREE OF M.D.

This degree is open to holders of the M.B., Ch.B. diploma, after a period of one or two years, according to circumstances, has elapsed since the date of the latter. The requirements are (*a*) an Examination in Clinical Medicine, or in some approved department of Medical Science or Practice, (*b*) a Thesis on any branch of knowledge comprised in the examinations for M.B., Ch.B., excepting a subject which is exclusively surgical, and (*c*) a fee of £15, 15s., with an extra charge of £5, 5s. for each re-entry.

DEGREE OF CH.M.

This may be obtained on practically the same terms as the M.D. degree, the only differences being (1) that the examination is on Surgical Anatomy,

operations upon the dead body, and Clinical Surgery or an approved special department of Surgery, and 2^d that the Thesis must not be on a subject which is exclusively medical.

DEGREE OF B.Sc. IN PUBLIC HEALTH.

Candidates must be graduates in Medicine of a University in the United Kingdom or of some other University recognised for the purpose by the Glasgow University Court, and they must thereafter have received practical instruction, including instruction in Chemistry, Bacteriology, and the Pathology of the Diseases of Animals transmissible to man, for at least twenty hours per week during a minimum period of eight months, five consecutive months of which must be in the Public Health Laboratory of the University of Glasgow. Either before or after graduation in Medicine they must also have attended, in the University of Glasgow or elsewhere, courses of Physics and Geology, and after graduation two separate courses in Public Health (Medicine and Engineering), as well as practically studying sanitary work for six months under a Medical Officer of Health in the United Kingdom, or a Sanitary Staff Officer of Health of the Royal Army Medical Corps, besides attending three months' practice of an Hospital for Infectious Diseases, where methods of administration can be studied, and three months in Mensuration and Draining. The examinations are, *First*, Public Health Laboratory Work, Physics, and Geology; *Second*, Sanitation, Sanitary Law, Vital Statistics, and Medicine in its bearings on Public Health. The examination fee is £6, 6s.

DEGREE OF D.Sc. IN PUBLIC HEALTH.

Five years after obtaining the B.Sc. degree, graduates may proceed to the higher Degree of D.Sc., the requirements being *a*) a Thesis or a published memoir or work to be approved by the Senate; and *b*) an examination in Public Health and in such of its special departments as the Senate and University Court may determine. The fee for this degree is £10, 10s.

QUEEN MARGARET COLLEGE FOR WOMEN.

A full course of Medicine and Surgery is obtainable partly at Queen Margaret College, but in recent years the tendency has been to have mixed classes at Gilmorehill. The regulations, fees, etc., are similar to those for men. The buildings are pleasantly situated in grounds of their own, close to the Botanic Gardens. The anatomical department is excellently arranged and most complete. Clinical work is amply provided for in the Royal Infirmary and its Dispensaries, and in the Royal Hospital for Sick Children, the Glasgow Maternity Hospital, the Royal Asylum of Gartnavel, and the Belvidere Fever Hospital. There are also arrangements for special study and research.

Students can have board and lodging at Queen Margaret Hall, within easy reach of the College, at the rate of about one guinea per week.

All information necessary can be obtained from Miss Melville, Queen Margaret College, Glasgow.

ST. MUNGO'S COLLEGE.

This, the Medical School of the Royal Infirmary, the largest hospital in Glasgow, is situated in Cathedral Square, Castle Street, and has an communication with every part of the city. St. Mungo's College is in the Infirmary grounds.

The Infirmary has, including the Ophthalmic Department, over 620 beds, the average number occupied in 1905 being 600. When the reconstruction of the Infirmary, long in progress, is completed, it will have about 700 beds. There are special beds and wards for Diseases of Women, of the Throat, Nose and Ear, Venereal Diseases, Burns, and Septic Cases.

At the Outdoor Department the attendances in 1905 numbered over 62,000. In addition to the large Medical and Surgical Departments, there are Departments for Special Diseases—namely, Diseases of Women, of the Throat and Nose, of the Ear, of the Eye, of the Skin, and of the Teeth. A fully-equipped Electrical Pavilion was opened a few years ago, and year by year the latest and most approved apparatus for diagnosis and treatment has been added. Wards are set apart for the teaching of women students.

Appointments.—Five House-Physicians and nine House-Surgeons, having a legal qualification in Medicine and Surgery, who board in the Hospital free of charge, are appointed every six months. Clerks and Dressers are appointed by the Physicians and Surgeons. As a large number of cases of Acute Diseases and Accidents of a varied character are received, these appointments are very valuable and desirable.

Fees.—The fees for hospital attendance, including Clinical Lectures and Tutorial Instruction, attendance at the Outdoor Department, at the Pathological Department, Post-Mortem Examinations, and the use of the Museum, which has not long since been rearranged and catalogued, are as follows:—For one year, £10, 10s.; for six months, £6, 6s.; for three months, £4, 4s. Students who have paid fees to the amount of £21 to the Glasgow Royal Infirmary are permitted to attend, in any subsequent year or years, one Winter and one Summer Course of Instruction in the Infirmary without further payment; and Students who have paid to any other hospital in the United Kingdom fees, being not less than £21, in virtue of which they are entitled to attend without further payment, shall be admitted as Students of the Royal Infirmary on payment of £3, 3s. for six months, or £1, 11s. 6d. for three months.

ANDERSON'S COLLEGE MEDICAL SCHOOL, DUMBARTON ROAD, PARTICK, GLASGOW.

The old Institution known as "Anderson's University" was founded by the will of John Anderson, M.A., F.R.S., in 1795, and the medical school connected therewith dates back to the year 1799.

In 1877 the name of the Institution was altered from "Anderson's University" to "Anderson's College." In 1887 the medical school of Anderson's College became a distinct Institution known as "Anderson's College Medical School."

The new buildings are situated in Dumbarton Road, immediately to the west of the entrance of the Western Infirmary and four minutes' walk from the University. They are constructed on the best modern principles, and are provided with all the appliances requisite for the conduct and management of a fully-equipped medical school.

Classes are conducted in all the subjects of the five years' curriculum:—

Anatomy—Professor A. M. Buchanan, M.A., M.D.

Physics—Professor Peter Bennett.

Chemistry—Professor J. Robertson Watson, M.A.

Botany—Professor B. G. Cormack, M.A., B.Sc.

Zoology—Professor W. Ferguson Mackenzie, M.B.

Physiology—Professor A. J. Ballantyne, M.D., Ch.B.

Materia Medica—Professor J. P. Duncan, M.B., B.Sc.

Medical Jurisprudence—Professor Carstairs Douglas, D.Sc., M.D., F.R.S.E.

Midwifery—Professor J. M. Munro Kerr, M.D., C.M.

Surgery—Professor G. Burnside Buchanan, B.A., M.B.

Practice of Medicine—Professor John Cowan, B.A., D.Sc., M.D.

Ophthalmic Medicine and Surgery—A. Freeland Fergus, M.D., F.R.S.E.

Oral Surgery—James Galbraith Connal, M.B.

Diseases of Throat and Nose—John Macintyre, M.B., F.R.S.E.

Mental Diseases—John Carswell, F.R.F.P.S.G.

Public Health Laboratory—Professor Carstairs Douglas, D.Sc., M.D., F.R.S.E.

Pathology—At the Western or Royal Infirmary.

Degrees and Diplomas.—Certificates of attendance on the classes at Anderson's College Medical School are received by the Universities of London and Durham, by the Royal University of Ireland, and by all the Royal Colleges and Licensing Boards in the United Kingdom. They are also recognised by the Universities of Glasgow and Edinburgh under certain conditions which are stated in the Calendar of this school. The Public Health Laboratory Course is recognised as qualifying for the Diploma granted by the University of Cambridge, the Scottish Conjoint Board, and the Royal Irish Colleges.

Candidates for the Licence in Dental Surgery can obtain at this school the full medical curriculum which is required. The courses special to dentistry are conducted at the Glasgow Dental School, 15 Dalhousie Street.

Malcolm Kerr Bursary in Anatomy. Value about £10. Open to students of the junior anatomy class during session 1907-1908.

The Carnegie Trust will pay the fees of students at Anderson's, on conditions regarding which particulars may be obtained from Sir W. S. McCormick, LL.D., Carnegie Trust Offices, Edinburgh.

Class Fees.—For each course of lectures (anatomy, ophthalmic medicine and surgery, aural surgery, diseases of throat and nose and mental diseases excepted): first session, £2, 2s.; second session (in Anderson's College), £1, 1s.; afterwards free. For practical classes (except anatomy), viz., chemistry, botany, zoology, physiology, pharmacy, operative surgery: first session, £2, 2s.; second session, £2, 2s.

Reduced joint fees in zoology and in botany, for lectures and practical class when taken in same summer session, £3, 3s.; for either course separately, £2, 2s.

Anatomy.—Winter—first session, lectures and practical anatomy, £5, 5s.; practical anatomy alone, £2, 2s.; second session, lectures and practical anatomy, £4, 4s.; practical anatomy, £2, 2s.; for summer fees, see Calendar.

ABERDEEN UNIVERSITY.

The course of study for the degree of M.B., Ch.B. extends over five years, of which two at least must be spent in the University of Aberdeen.

The curriculum is the same as in the other Scottish Universities as far as relates to attendance on University classes, to clinical study at a General Hospital, to attendance on courses of Clinical Surgery, Clinical Medicine, Mental Diseases, and Practical Pharmacy, Operative Surgery, Anæsthetics, to instruction in Vaccination, to attendance on Cases of Labour, and to the practice of a Dispensary.

The candidate must also, before admission to the final examination, produce the following certificates:—

1. That he has been present at not fewer than twenty-five post-mortem examinations, some of which he must have personally taken part in performing.

2. That he has attended a course of instruction in Infectious Diseases consisting of not fewer than ten meetings, in a Hospital for the treatment of such diseases containing at least a hundred beds.

3. That he has attended in a Hospital a course of instruction in Gynecology consisting of not fewer than twenty meetings.

4. That he has attended in a special hospital a course of instruction in the Diseases of Children, consisting of not fewer than twenty meetings.

5. That he has attended in the Ophthalmological Department of a Hospital or Dispensary a course of instruction in Ophthalmology, consisting of not fewer than thirty meetings extending over one term.

6. That he has attended in a Public Hospital or Dispensary a course of instruction in Diseases of the Ear, Nose, and Throat, consisting of not fewer than twenty meetings.

7. That he has attended in a Public Hospital or Dispensary a course of instruction in Dermatology, consisting of not fewer than twenty meetings.

Certificates for these various classes and courses must attest not only regular attendance, but also due performance of the work.

There is no prescribed order of study, but a scheme, representing the minimum curriculum, has been drawn up for the guidance of students, and is printed in the Calendar.

THE FOLLOWING ARE THE CLASSES IN THE MEDICAL FACULTY:—
WINTER SESSION.

Zoology—Professor John Arthur Thomson, M.A.
Chemistry—Professor Japp, M.A., LL.D., F.R.S.
Anatomy—Professor Reid, M.D., F.R.C.S.
Practical Anatomy—Professor Reid and Assistants.
Physiology (Syst. and Pract.)—Professor MacWilliam, M.D.
Materia Medica—Professor Cash, M.D., LL.D., F.R.S.
Pathology (Syst. and Pract.)—Professor George Dean, M.B., C.M.
Surgery—Professor John Marnoch, M.A., M.B., C.M.
Medicine—Professor Mackintosh, M.A., M.D.
Midwifery and Diseases of Women and Children—Professor R. G. McKerron, M.A., M.D.

SUMMER SESSION.

Botany—Professor Trail, M.A., M.D., F.R.S.
Practical Botany—Professor Trail.
Zoology—Professor Thomson.
Practical Zoology—Professor Thomson.
Physics—Professor Niven, M.A., D.Sc., F.R.S.
Practical Chemistry—Professor Japp and Assistants.
Practical Anatomy—Professor Reid and Assistants.
Practical Materia Medica and Pharmacy—Professor Cash and Assistants.
Physiology (Syst. and Pract.)—Professor MacWilliam.
Forensic Medicine—Professor Hay, M.D., LL.D.
Practical Hygiene and Forensic Medicine—Professor Hay.
Pathology (Syst. and Pract.)—Professor Dean.
Practical Midwifery and Gynaecology and Clinical Diseases of Children—Professor McKerron.

Systematic and Practical Pathology, and Systematic and Practical Physiology respectively are now taught as part of one continuous course, occupying a whole academic year, *i.e.* a summer and a winter session.

There are Assistants to the Professors in the Medical Faculty appointed annually, two in the Department of Anatomy, Physiology, Botany, Zoology, Pathology, Materia Medica and Chemistry, and one in each of the other departments.

Clinical Medicine and Clinical Surgery are taught by the Physicians and Surgeons of the Royal Infirmary.

The following are recognised as Lecturers:—

Lecturer on Mental Diseases . . .	Wm. Reid, M.D.
„ Ophthalmology . . .	{ C. H. Usher, M.B., B.S., F.R.C.S. A. Rudolph Galloway, M.A., M.B., C.M.
Lecturer on Vaccination . . .	T. Fraser, M.A., M.B., Ch.B.
„ Skin Diseases . . .	J. F. Christie, M.A., M.B., C.M.
„ Diseases of Ear, Throat . . .	J. Mackenzie Booth, M.D., C.M.
„ and Nose . . .	{ H. Peterkin, M.B. J. R. Leveck, M.B., C.M.
„ Medical Electricity . . .	{ A. W. Falconer, M.D. D. W. Geddie, M.B., C.M.
„ Anæsthetics . . .	

All the University Classes are held at Marischal College.

Tutorial Classes are held in connection with most of the Systematic Courses, and practical instruction is given in the fully-equipped Laboratories connected with the several departments.

Graduates or others desirous of engaging in special study or research may be allowed by the Senatus to work in any of the Laboratories on payment of the usual matriculation fee.

General clinical instruction is obtained in the following Medical Institutions :—

The Royal Infirmary of Aberdeen.

This General Hospital, situated about seven minutes' walk from Marischal College, has been recently constructed on the most modern principles, and is fully equipped with all the requirements for medical work and teaching. It accommodates upwards of two hundred patients: the number of patients admitted during the year 1911 was 3147, and the number of out-patients treated during the same period was 18,886.

Six resident medical officers are appointed annually, three in May and three in September, to hold office for twelve months. Salary, £26, 5s. with board.

Fees.—Perpetual fee to hospital practice, £6, or first year, £3, 10s., second year, £3, afterwards free; clerkship in medicine, £1, 1s.; dressership in surgery, £1, 1s.; pathological demonstrations, £2, 2s. (Special courses of lectures are charged for.)

The Royal Hospital for Sick Children

Is situated about five minutes' walk from Marischal College, and accommodates over 80 patients. The number of patients admitted in 1911 was 1100, and the number of out-patients treated 2159. Each student must act as clerk for six weeks in the medical and surgical wards respectively.

There is one qualified house physician and surgeon (resident) who holds office for six months. Salary at the rate of £25 per annum.

Fee for hospital practice, £2, 2s. first year; subsequent years, £1, 1s.

The Royal Asylum

Is about fifteen minutes' walk from Marischal College. It accommodates over 950 patients, and has been recently fitted up with a fully-equipped hospital and a laboratory.

The senior physician is recognised by the University as lecturer on mental diseases, and delivers a qualifying course of lectures.

The City (Fever) Hospital

Is about ten minutes' walk from Marischal College, and accommodates 200 patients.

Senior students are admitted for instruction in fevers twice a week under the visiting physician (who is the Medical Officer of Health for the City) and his assistant. Fee, £1, 1s.

General Dispensary, Maternity Hospital and Vaccine Institution.

This is about five minutes' walk from Marischal College.

The total number of cases treated during 1911 was 13,129, and the number of patients treated at their own homes 3053. There were 432 midwifery cases.

Fees.—General practice, £3, 3s.; vaccination certificate and instruction, £1, 1s.; Maternity Hospital, £3, 3s.

Ophthalmic Institution.

This Institution is situated about three minutes' walk from Marischal College. The surgeon in charge is recognised by the University as a lecturer on ophthalmology.

During 1910, 50 in-patients and 4537 out-patients were treated.

PROFESSIONAL EXAMINATIONS.

There are four examinations: the subjects and regulations of these are common to the Universities of Aberdeen and Glasgow.

DEGREE OF M.D.

The regulations with regard to the age and other qualifications of the candidate are similar to those in the other Scottish Universities. He must submit a thesis written by himself upon any medical subject, and pass an examination in Clinical Medicine and in such Special Departments of Medicine as he may select.

DEGREE OF CH.M.

Each candidate must be not less than twenty-four years of age, and must hold the degree of M.B., Ch.B. of the University. He must produce a certificate of having been engaged for at least one year in attendance in the surgical wards of a hospital, or in scientific research, or in the naval and military services, or for two years in practice other than practice restricted to medicine. He must present a thesis on a surgical subject and pass an examination on Clinical Surgery, Surgical Anatomy, and Operations on the Dead Body.

DIPLOMA IN PUBLIC HEALTH (D.P.H.).

The diploma is conferred, after special instruction and examination, on any one who has been at least twelve months a graduate in medicine of a University in the United Kingdom: if not a graduate of Aberdeen University, the candidate must attend a course of instruction in this University in one or more subjects embraced in the examination for the diploma.

Each candidate must have attended a course of instruction in Public Health.

The qualifying post-graduate instruction embraces—

- (a) Regular attendance, for three months, at a hospital for infectious diseases, at which opportunities are afforded for the study of methods of administration.
- (b) Daily association for a period of six months (of which at least three months must be distinct from the period of laboratory instruction) in the duty, routine and special, of Public Health Administration, under the supervision of a recognised Medical Officer of Health.
- (c) Practical instruction, for at least six months, in laboratory work, which includes examination of water, air, soil and foods, and the study of bacteriology, disinfection, ventilation, water supply and sewerage, and the framing of reports of analysis. The laboratory attendance must extend over at least fifteen hours a week.

The qualifying courses of laboratory instruction in Aberdeen University are given in the Public Health Laboratory (Fee, £6, 6s.), and the Bacteriological Laboratory (Fee, £4, 4s.).

Instruction in Public Health Administration is given by Professor Hay, Medical Officer of Health of the City of Aberdeen (Fee, £6).

Instruction is given in the Drawing and Interpretation of Plans (Fee, £1, 1s.).

A short course of lectures is given on Statistical Methods and their application to Public Health Statistics.

The diploma is conferred after an examination in March and July of each year.

The examination is written, oral and practical, and is divided into two parts.

Part I. embraces the following subjects in their application to Public Health:—

- (a) Physics, Engineering and Meteorology.
- (b) Chemistry, Microscopy and Bacteriology.

Part II. embraces—

(a) General Hygiene.

(b) Sanitary Law and Vital Statistics.

Part I. may be taken alone, or both parts together.

The written examinations occupy two days, and the oral and laboratory and outdoor examinations three to four days.

Candidates must send in their names and pay the fees a fortnight before the examination. Examination fee is five guineas. Re-examination fee one guinea.

SUMMARY OF FEES.

I. UNIVERSITY FEES.

(a) Preliminary Examination (each occasion)	. . . . .	£0 10 6
(b) Matriculation—For whole year	. . . . .	1 1 0
For Summer Session	. . . . .	0 10 6
(c) Class Fees—		
Each Systematic Course—For Winter or Full Course	. . . . .	4 4 0
Each subsequent attendance	. . . . .	3 3 0
For Summer or Half Course	. . . . .	3 3 0
Each subsequent attendance	. . . . .	3 3 0
Each Practical Course and subsequent attendance	. . . . .	3 3 0
Except { Practical Anatomy in Summer	. . . . .	2 2 0
{ Practical Midwifery	. . . . .	2 2 0
(d) Degree Fees—For M.B., Ch.B.—		
1st Professional Exam.	. . . . .	£5 5 0
2nd " "	. . . . .	5 5 0
3rd " "	. . . . .	5 5 0
4th " "	. . . . .	7 7 0
		<hr/>
		23 2 0
Re-examination Fee for not more than two subjects	. . . . .	1 1 0
for each additional subject	. . . . .	0 10 6
For M.D.	. . . . .	10 10 0
For Ch.M.	. . . . .	10 10 0
Re-examination Fee	. . . . .	2 2 0

II. NON-UNIVERSITY FEES.

Royal Infirmary—Perpetual Fee	. . . . .	6 0 0
Children's Hospital	. . . . .	2 2 0
Dispensary—Perpetual Fee	. . . . .	3 3 0
City (Fever) Hospital	. . . . .	1 1 0
Lectures on Clinical Medicine—Winter Session	. . . . .	4 4 0
" " Summer "	. . . . .	3 3 0
" Clinical Surgery—Winter Session	. . . . .	4 4 0
" " Summer "	. . . . .	3 3 0
Clerkship at Royal Infirmary	. . . . .	1 1 0
Dressership " "	. . . . .	1 1 0
Course of Lectures on	{ Mental Diseases Diseases of Eye Diseases of Ear and Throat Diseases of Skin	
	{ Clinical Gynæcology Medical Electricity Anæsthetics. Dental Surgery Post-Mortem Room	Each 2 2 0
Instruction in		
Instruction in Vaccination	. . . . .	1 1 0

The cost of matriculation, class and hospital fees for the whole curriculum, exclusive of fees for degrees, is usually about £120.

UNIVERSITY OF ST. ANDREWS.

The degrees conferred are Bachelor of Medicine and Bachelor of Surgery (M.B., Ch.B.), Doctor of Medicine (M.D.), and Master of Surgery (Ch.M.). The inclusive fee for University instruction for M.B., Ch. B. is 90 guineas; and the inclusive fee for the clinical courses is 40 guineas. For M.D. or Ch.M. the fee payable is 15 guineas.

Two constituent colleges of the University provide medical teaching. The United College, St. Andrews, offers classes for two years, and the student may pass the first two professional examinations at St. Andrews. There are excellent opportunities for combining degrees in Arts and Science with those of Medicine. At the United College, St. Andrews, thirteen bursaries tenable in the Faculties of Arts, or Science, or Medicine are open to men who are entering the University this year. Nine bursaries are vacant this session for women only who intend to take a medical course. Two bursaries, each of the annual value of £25 and tenable for five years, may be held by men or women. The cost of rooms and living in St. Andrews is considerably less than in the larger towns. For women there is an excellent residential hall controlled by the University authorities. There are special new buildings for the medical school.

The Conjoint School of Medicine, University College, Dundee, supplies a complete course of medical study, and the student of United College, St. Andrews, usually completes his course there. Several bursaries are offered for competition. Large and commodious new buildings for this medical school, with well-equipped laboratories and dissecting-rooms, afford ample scope for study. Besides the supervision of individual students which larger schools cannot offer, there are unrivalled opportunities for clinical and out-patient work at the Royal Infirmary, Dundee.

This Hospital is provided with 400 beds, including special wards for obstetrics, gynaecology, children's diseases, ophthalmology, diseases of the skin, diseases of ear, nose, and throat, incipient insanity, and electrical therapeutics. New out-patient departments have just been completed. There is a large out-door maternity department, and there are dispensaries in various parts of the city. Hospital fees—Surgical and Medical, £3, 3s. yearly; £1, 1s. quarterly; Perpetual Ticket, £10, or in instalments, £10, 10s.; Obstetric Cases, £2, 2s.; Obstetric Clinic, £1, 1s.

The large asylum at Liff provides material for instruction in mental diseases, and the City Fever Hospital for that in fevers. The Dundee Eye Institution affords cases for teaching in ophthalmology.

The Diploma of Public Health (D.P.H.) of St. Andrews University may be taken at University College, Dundee.

All classes in the University are open to men and women alike. The session is divided into three terms—Martinmas Term extends from October to December 1912; Candlemas Term from January to March 1913; Whitsunday Term from April to June 1913.

UNITED COLLEGE, ST. ANDREWS.

PROFESSORS AND LECTURERS.

<i>Physics</i> —	Professor Butler, M.A.
<i>Chemistry</i> —	Professor Irvine, Ph.D., D.Sc.
<i>Zoology</i> —	Professor Mackintosh, M.D., LL.D., F.R.S.
<i>Botany</i> —	R. A. Robertson, M.A., B.Sc.
<i>Physiology</i> —	Professor Herring, M.D.
<i>Anatomy</i> —	Professor Musgrove, M.D., F.R.C.S.
<i>Regional Anatomy</i> —	D. D. Craig, B.Sc., M.B.

UNIVERSITY COLLEGE, DUNDEE.

PROFESSORS AND LECTURERS.

<i>Physics</i> —	Professor Peddie, D.Sc.
<i>Chemistry</i> —	Professor Hugh Marshall, D.Sc., F.R.S.
<i>Zoology</i> —	Professor Thompson, M.A., C.B.
<i>Botany</i> —	Professor Geddes, F.R.S.E.
<i>Physiology</i> —	Professor Waymouth Reid, M.B., F.R.S.
<i>Anatomy</i> —	Principal Mackay, M.D., LL.D. Lieut.-Col. Lamont, M.B., I.M.S. (retired).
<i>Surgery</i> —	Professor MacEwan, M.D., C.M.
<i>Surgery, Clinical</i> —	D. M. Greig, C.M., F.R.C.S.
<i>Medicine</i> —	Professor Stalker, M.D.
<i>Medicine, Clinical</i> —	Professor Stalker, M.D. ; J. Mackie Whyte, M.D.
<i>Materia Medica</i> —	Professor C. R. Marshall, M.D.
<i>Pathology</i> —	Professor Sutherland, M.B.
<i>Midwifery and Gynecology</i> —	Professor Kynoch, M.B., F.R.C.P., L.R.C.S.
<i>Midwifery and Gynecology, Clinical</i> —	Professor Kynoch, M.B. R. C. Buist, M.D.
<i>Forensic Medicine</i> —	C. Templeman, M.D., D.Sc., M.O.H.
<i>Ophthalmology</i> —	Angus MacGillivray, M.D.
<i>Diseases of Ear, Nose, and Throat</i> —	G. Taylor Guild, M.B.
<i>Diseases of Children</i> —	D. M. Greig, C.M., F.R.C.S. J. S. Y. Rogers, M.B.
<i>Diseases of Skin</i> —	W. E. Foggie, M.D.
<i>Mental Diseases</i> —	W. Tuach Mackenzie, M.D.
<i>Vaccination</i> —	R. C. Buist, M.D.
<i>Clinical Pathology</i> —	F. M. Milne, M.B., D.P.H.
<i>Clinical Medical Tutor</i> —	Charles Kerr, M.D.
<i>Dean of the Faculty of Medicine</i> —	Professor Kynoch.

QUALIFICATIONS GIVEN BY THE SCOTTISH COLLEGES.

The Royal College of Physicians of Edinburgh, the Royal College of Surgeons of Edinburgh, and the Royal Faculty of Physicians and Surgeons of Glasgow, conjointly confer the Triple Qualification (L.R.C.P.E., L.R.C.S.E., L.R.F.P.S.G.). Female candidates are admitted to the examinations for this qualification.

PRELIMINARY EXAMINATION. — This examination must be passed before the student commences professional study. It may be passed before any of

the Boards recognised by the General Medical Council, and enumerated in the Regulations of the Colleges. The Educational Institute of Scotland conducts a qualifying Preliminary examination for medical students, in Edinburgh and Glasgow, on behalf of the Colleges. This examination embraces English, Latin, Mathematics, and either Greek, French, German, Italian, or other modern language. All the subjects must be passed at one time. Calendar, containing examination papers, can be had from Mr. Hugh Cameron, M.A., 34 North Bridge Street, Edinburgh. Price 1s.

PROFESSIONAL EDUCATION.—The curriculum must extend over five years. Graduates in Arts or Science of any recognised University who have spent a year in the study of Physics, Chemistry, and Biology, and have passed an examination in these subjects for the degrees in question, are exempted from the first year of study. The fifth year of study should be devoted to clinical work in one or more recognised Hospitals or Dispensaries, and to the study of special diseases. For information regarding the payment of class fees by the Carnegie Trust, *vide* p. ii.

ORDER OF STUDY WHICH IS RECOMMENDED.

- First Summer*— Physics and Elementary Biology.
First Winter— Five months' course in Chemistry and Anatomy; three months' course in Practical Chemistry; Practical Anatomy.
Second Summer— Practical Anatomy; Practical Physiology.
Second Winter— Practical Anatomy; Physiology—Five months' course.
Third Summer— Three months' course in Practical Pathology, Materia Medica, and Practical Materia Medica; Surgical Hospital Practice.
Third Winter— Six months' course in Surgery and Clinical Surgery; Attendance at Surgical Wards, Anæsthetics; Pathology.
Fourth Summer— Three months' course in Midwifery and Gynæcology, in Medical Jurisprudence and Public Health, and in Clinical Surgery; Hospital Practice.
Fourth Winter— Six months' course in Medicine and Clinical Medicine; Hospital Practice.
Fifth Summer— Three months at Clinical Medicine; Hospital; Insanity; Diseases of Children; Diseases of Eye.
 Practical Midwifery—Personal attendance on twelve cases under the supervision of a medical practitioner, or three months' attendance at a Lying-in Hospital and personal attendance on six cases.
Fifth Winter— Hospital Practice; Fevers; Dispensary; Vaccination; Skin Diseases; Ear and Throat Diseases; Eye Diseases; Operative Surgery.

PROFESSIONAL EXAMINATIONS.—Four of these are held during the curriculum. Each is held quarterly in Edinburgh and twice a year in Glasgow. Candidates may enter for all or any of the subjects at the First, Second, and Third Examinations. In the Final Examination the subjects of Medicine, Surgery and Midwifery shall be taken together at the conclusion of five Winters and five Summers of Medical Study, provided that a period of twenty-four months has elapsed since passing the Second Professional Examination; and the subject of Medical Jurisprudence and Public Health may be taken at any time after passing the Third Examination. Candidates are advised to enter for the entire examinations.

- First Examination*— Physics, Chemistry and Elementary Biology. This should be passed before the beginning of the second winter session.
Second Examination— Anatomy, Physiology, including Histology. This should be passed at the end of the second year of study.

Third Examination—Pathology, Materia Medica and Pharmacy. This should be taken at the end of the third year.

Final Examination—Can only be taken at the end of the fifth year. The candidate must have attained the age of twenty-one.

It includes—

1. Medicine, Therapeutics, Medical Anatomy, Clinical Medicine.
2. Surgery, Surgical Anatomy, Clinical Surgery, Diseases of the Eye.
3. Midwifery and Diseases of Women and New-born Children.
4. Medical Jurisprudence and Public Health. This can be taken any time after the Third Examination.

FEES FOR PROFESSIONAL EXAMINATIONS.

For each of the first three, £5; for the final, £15. The minimum total expense, inclusive of fees for classes and examinations, amounts to £115.

DIPLOMA IN PUBLIC HEALTH OF THE ROYAL COLLEGES.

The Diploma is granted by the Triple Qualification Board.

1. Every candidate for examination must have held a registrable medical qualification for one year.

2. After obtaining such qualification he must have attended during six months a recognised Laboratory in which Chemistry, Bacteriology, and the Pathology of the Diseases of Animals transmissible to man are taught; and the certificate must show that the candidate has conducted Chemical and Bacteriological analyses of air, water, sewage and foods, and certify that the candidate has attended not less than 240 hours, of which not more than one-half shall be devoted to Practical Chemistry.

3. After obtaining a medical qualification he must during six months have been engaged in acquiring a practical knowledge of the duties of Public Health Administration, under the supervision of—

(a) In England or Wales, the Medical Officer of Health of a County or single sanitary District having a population of not less than 50,000, or a Medical Officer of Health devoting his whole time to Public Health work; or

(b) In Scotland or Ireland the Medical Officer of Health of a County or District or Districts with a population of not less than 30,000; or

(c) In Ireland, a Medical Superintendent Officer of Health of a District or Districts having a population of not less than 30,000; or

(d) In the British Dominions outside the United Kingdom, a Medical Officer of Health of a Sanitary District having a population of not less than 30,000, who himself holds a Registrable Diploma in Public Health; or

(e) A Medical Officer of Health who is also a Teacher in the Department of Public Health in a recognised Medical School.

(f) A Sanitary Staff Officer of the Royal Army Medical Corps having charge of an Army Corps, District, Command, or Division recognised for the purpose by the General Medical Council.

4. After obtaining a medical qualification he must have attended for three months at least twice weekly the practice of a Hospital for Infectious Diseases.

The examination consists of two parts. The first part includes—(a) Laboratory work, with Chemistry and Bacteriology; (b) Physics and Meteorology.

The Second Examination embraces—(a) Report on premises visited; (b) Examination at Fever Hospital; (c) Examination at Public Abattoir; (d) Epidemiology and Endemiology; (e) Vital Statistics and Sanitary Law; (f) Practical Sanitation.

Each examination is held bi-annually, in October and May. The fee for

each is £6, 6s. ; for re-examination, £3, 3s. Fees and applications to be lodged with Mr. James Robertson, 54 George Square, Edinburgh ; or with Mr. Alex. Duncan, LL.D., 242 St. Vincent Street, Glasgow.

MEMBERSHIP AND FELLOWSHIP OF THE ROYAL COLLEGE OF PHYSICIANS, EDINBURGH.

Every applicant for the *Membership* must possess a recognised qualification, and be not less than twenty-four years of age. He must pass an examination on Medicine and Therapeutics, on Clinical Medicine, and on some Special Department of Medicine, such as Psychological Medicine, General Pathology and Morbid Anatomy, Medical Jurisprudence, Public Health, Midwifery, Diseases of Women, Diseases of Children, Tropical Medicine, etc. The Membership is conferred by election.

The fee for the Membership is thirty-five guineas, except the applicant be a Licentiate of the College, when it is twenty guineas.

Members of not less than three years' standing may be raised by election to the *Fellowship*, the fee being thirty-eight guineas, exclusive of Stamp Duty of £25.

FELLOWSHIP OF THE ROYAL COLLEGE OF SURGEONS, EDINBURGH.

Every candidate must be twenty-five years of age, and must have been engaged for two years in the practice of his profession, after having obtained a recognised qualification in Surgery. The petition for examination must be signed by two Fellows—a proposer and seconder.

The candidate must pass an examination on Principles and Practice of Surgery, including Surgical Anatomy, Clinical Surgery, and any one of the optional subjects: Ophthalmic Surgery, Aural, Nasal and Laryngeal Surgery, Dental Surgery, Surgical Pathology and Operative Surgery, Gynæcology, Advanced Midwifery with Obstetric Surgery, Advanced Anatomy.

The fee is £45, except the candidate be a Licentiate of the College when the fee is £35. Further particulars may be obtained from the Clerk to the College, 54 George Square, Edinburgh.

FELLOWSHIP OF THE ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.

Every candidate must have been qualified for two years, and be aged twenty-four. Admission to the Fellowship is by examination and subsequent election. The candidate is examined on either (*a*) Medicine (including Clinical Medicine, Medical Pathology, and Therapeutics), or (*b*) Surgery (including Clinical Surgery, Operative Surgery, Surgical Anatomy, and Surgical Pathology); and on one optional subject—Anatomy, Physiology, Pathology, Midwifery, Diseases of Women, Medical Jurisprudence, Ophthalmic Surgery, Aural, Laryngeal and Nasal Surgery, Dental Surgery, State Medicine, Psychological Medicine or Dermatology.

The fee is £30, except the candidate be a Licentiate of the Faculty, when it is £15.

The Fellowship Diploma is now open to Women.

MEDICAL EDUCATION OF WOMEN IN EDINBURGH.

SCHOOL OF MEDICINE FOR WOMEN, SURGEONS' HALL.

The courses of instruction given in this School qualify for graduation in Medicine. The curriculum and class fees are the same as for male students proceeding to the University Degree or College Qualification respectively. Clinical tuition is provided in the Royal Infirmary and Sick Children's Hospital.

The prospectus of the College, and any information regarding the medical education of women in Edinburgh, may be obtained from the Secretary, Dean's Office, School of Medicine for Women, Surgeons' Hall, Edinburgh.

POST-GRADUATION STUDY.

The different University Laboratories provide facilities for research work. In most cases no fees are charged, but those engaged in research work are expected to defray the expense of materials. The Laboratory of the Royal College of Physicians of Edinburgh is splendidly equipped for the carrying out of all branches of medical research. It is available for research work to Members and Fellows of the Royal Colleges of Edinburgh and to other applicants approved by the Council of the Royal College of Physicians. No fees are charged, and the ordinary reagents, &c., are provided. By arrangement with the Superintendent, workers may have the assistance of members of the Laboratory Staff. Special post-graduate courses may be arranged.

EDINBURGH POST-GRADUATE COURSES IN MEDICINE.

These courses, which are held during the Summer Vacation, are arranged by a Committee appointed by the University and School of the Royal Colleges. The programme for 1912 has not yet been drawn up, but will no doubt be somewhat similar to that for 1911, which was as follows:—

July:—A series of classes dealing for the most part with *Diseases of Children* was arranged for during the last fortnight of the month.

August:—A Four Weeks' Course on *Internal Medicine*. This included series of clinics upon diseases of the various systems, in addition to classes upon Applied Anatomy, Haematology, Bacteriology and the Examination of the Heart, Urine and Digestive Products and Nervous System. Between six and seven hours' instruction daily. Attendance limited to twenty-five. *Fee* Ten Guineas.

September:—A Four Weeks' *General Course*. Each fortnight was quite independent and might be taken separately. This included Medical and Surgical Clinics, Clinical Neurology, Dermatology, Fevers, Ophthalmology, Pediatrics, Infant Feeding, Applied Anatomy, Morbid Anatomy, Pathological Histology, etc. *Fee* Five Guineas for the month or Three Guineas for either fortnight. A series of lectures upon Vaccines and Vaccine Therapy and other subjects of general interest was given in connection with the course. These lectures were open to all practitioners.

A Four Weeks' *Surgical Course* included Surgical Clinics, Applied Anatomy, Surgical Pathology, Operative Surgery, etc. Attendance limited to twenty-five. *Fee* Ten Guineas.

A Course on the *Ear, Nose, and Throat* included classes on the pathology of this subject and operative work in addition to demonstrations on the methods of examination, clinics, etc. *Fee* Ten Guineas.

A *Series of Classes*, the entries for which were limited, upon Haematology, Bacteriology, X-Rays, Gynaecology, Gynecological Pathology, Ophthalmoscopy, Errors of Refraction, Ear, Nose and Throat, Histological Methods, &c. These classes were open only to those who had entered for the General, Surgical, or Ear, Nose and Throat courses, on payment of an Additional Guinea in each instance.

In addition to these courses the classes throughout the year on Bacteriology, Diseases of the Blood, Diseases of the Tropics, Neurology, &c., are attended by a number of graduates.

Particulars of these classes are to be had from the Secretary, The New University.

GLASGOW ROYAL INFIRMARY AUTUMN POST-GRADUATE CLASSES.

These include Demonstrations on Diseases and Injuries of the Eye, Surgical Diseases of the Kidneys and Bladder, Clinical Medicine, Clinical Surgery, Diseases of the Ear, Diseases of Throat and Nose, Hamatology, Gynæcology, Practical Pathology and Bacteriology.

Those desirous of attending any of the classes are requested to communicate with Dr. Thom, Superintendent, Royal Infirmary, from whom a syllabus may be obtained.

THE ROYAL NAVY MEDICAL SERVICE.

A CANDIDATE must be between 21 and 28 years of age. He must declare : (1) his age, and date and place of birth ; (2) that he is of pure European descent, the son either of natural-born British subjects or of parents naturalised in the United Kingdom ; (3) that he labours under no mental or constitutional weakness ; (4) that he is ready to engage for general service at home or abroad ; (5) that he is registered under the Medical Acts as duly qualified professionally, and what diplomas, etc., he holds. Copies of the Regulations for the entry of candidates for commissions will be furnished on application to the Medical Director-General, Admiralty, London, S.W.

The entrance examination consists of two parts. Part I.—*Compulsory* (a) Medicine (including Medical Pathology and Therapeutics), 1200 marks ; (b) Surgery (including Surgical Pathology), 1200 marks. A competent knowledge of Operative Surgery is essential.

Successful candidates, immediately after passing this examination, will receive commissions as surgeons in the Royal Navy, and will undergo a course of practical instruction in Naval Hygiene, the Diseases of Warm Climates, etc., at Haslar Hospital.

Full Pay (yearly).—Surgeon (on entry), £255, 10s. ; after four years' full-pay service, £310, 5s. ; after eight years' full-pay service, or on promotion to Staff-surgeon, £365 ; after twelve years' service, £438 ; Fleet-surgeons (on promotion), £492, 15s. ; after four years' full-pay service in that rank, £547, 10s. ; after eight years' full-pay service, £602, 5s. ; after ten years' service, £638, 15s. ; Deputy Surgeon-General, £821, 5s. ; Director-General, £1800.

Allowances.—The senior medical officer of ships bearing the flag of flag officers commanding foreign stations and the Channel receives an allowance of 5s. a day. An allowance of 2s. 6d. a day may be granted to the senior medical officer of ships bearing the flag of flag officers not commanding stations or fleets and to ships flying the broad pennant of commodores. Medical officers conducting the course of instruction at Haslar Hospital receive the following allowances :—The two senior officers employed on this duty, £150 a year each ; the junior officer assisting, £50 a year ; the junior officer instructing the sick berth staff, £50 a year. The following charge allowances may be granted to medical officers in charge of hospital ships :—If above the rank of Fleet-surgeons, 5s. a day ; if of the rank of Fleet-surgeon or junior, 3s. 6d. a day. Hospital allowances for naval medical officers at home and abroad, in lieu of provisions for themselves and servants, and for fuel and lights, are as follows :—Deputy Inspector-Generals, at home, £67 ; abroad, £112 ; Fleet or Staff-surgeons, at home, £53 ; abroad, £112 ; Surgeons, at home, £39 ; abroad, £108.

Half Pay (per diem).—As the Medical Department is never overmanned it is comparatively rare for an officer to be unemployed if fit for duty. The rates, however, are :—Surgeons under two years' full-pay service, 6s. ; after two years' full-pay service, 7s. ; after four years' full-pay service, 8s. ; after six years, 9s. ; after eight years, 10s. ; after ten years, 11s. Staff-surgeon on promotion, 12s. ; after fourteen years, 13s. ; after sixteen years, and on promotion to Fleet-surgeon, 14s. ; after eighteen years, 15s. ; after twenty years, 17s. ; after twenty-two years, 18s. ; and after twenty-four years, 20s.

Deputy Inspector-General on promotion, 25s. ; after two years' full-pay service in rank, 27s. ; after four years, 29s. Inspector-General, 38s.

Every medical officer will be required to undergo a post-graduate course of three months' duration at a metropolitan hospital once in every eight years. While carrying out this course, he will be borne on a ship's book for full pay and will be granted lodging and provision allowances and travelling expenses. The fees for each course (not exceeding £25) will be paid by the Admiralty. The medical officer will be required to produce separate certificates of efficient attendance in (1) the medical and surgical practice of the hospital ; (2) a course of operative surgery on the dead body ; (3) a course of bacteriology ; (4) a course of ophthalmic surgery, particular attention being paid to the diagnosis of errors of refraction ; (5) a practical course of skiagraphy.

ROYAL ARMY MEDICAL CORPS.

The conditions of service are as follows :—

A candidate for a commission must be 21 years of age, and not over 28 years of age, at the date of commencement of the entrance examination. He must possess a registrable qualification to practise. Regulations, forms of application, and declaration may be obtained on application to the Director-General, Army Medical Service, 68 Victoria Street, London, S.W. The Dean of the candidate's medical school will be requested to render a confidential report as to the candidate's character, conduct, professional ability and fitness, and to this report special importance will be attached. The candidate may subsequently be allowed to compete for a commission, having been previously examined as to physical fitness by a Medical Board.

The *Entrance Examination* held twice a year, usually in January and July is of a clinical and practical character, partly written, and partly oral, marks being allotted under the following scheme :—

MEDICINE written.		Maximum Marks.
A. Examination and report upon a medical case in the wards of a hospital		125
B. Commentary upon a case in medicine		100
MEDICINE (oral).		
A. Clinical cases		100
B. Medical pathology		75
SURGERY (written).		
A. Examination and report upon a surgical case in the wards of a hospital		100
B. Commentary upon a case in surgery		125
SURGERY (oral).		
A. Clinical cases, including diseases of the eye ; surgical instruments and appliances		75
B. Operative surgery and surgical anatomy		100
Total marks		800

Having gained a place in this entrance examination, the successful candidates are appointed Lieutenants on probation, and undergo two courses of instruction at the Royal Army Medical College and Aldershot respectively, and at the end of the course will be examined in the subjects taught.

EXAMINATIONS FOR PROMOTION.

Lieutenant before promotion to Captain (for Lieutenants appointed after 31st March 1901). This examination may be taken at any time after completing eighteen months' service. The subjects of the examination are : (1) Regimental duties ; (2) drill ; (3) military law ; (4) duties and accounts connected with military hospitals and their supplies ; (5) other duties of executive medical officers.

Captains before promotion to Majors (for Captains promoted to that rank after 27th July 1895). This examination may be taken at any time after completing five years' service, after terminating a period of special study. The subjects of the examination are : medicine, including specific fevers, surgery, including skiagraphy, hygiene, bacteriology, and tropical diseases, and one special subject from the subjoined list, to which additions may from time to time be made—bacteriology (including the preparation of antitoxins), dental surgery, dermatology, midwifery and gynæcology, advanced operative surgery, ophthalmology, otology, including laryngology and rhinology, psychological medicine, State medicine.

Majors for promotion to Lieutenant-Colonel (for Majors promoted to that rank after 31st March 1895). This examination may be taken at any time after three years in the rank of Major. The subjects of this examination are: (1) Military law; (2) army medical organisation; (3) sanitation of towns, camps, transports, &c., epidemiology and the management of epidemics; (4) the laws and customs of war in relation to the sick and wounded; (5) one special subject, *e.g.* (a) medical history of important campaigns; (b) a general knowledge of the army medical services of other powers.

PAY.

	Inclusive of all allowances except field and travelling allowances.
Director-General	£2000 0 0
Deputy Director-General	1500 0 0
Surgeon-General	1447 16 0
Colonel	1008 16 0
Lieutenant-Colonel	711 4 0
Major	583 9 0
Major after 3 years' service as such	629 2 0
Captain	372 1 0
„ after 7 years' full-pay service	399 9 0
„ „ 10 „ „ „	472 9 0
Lieutenant	325 19 0

Retired Pay.

Director-General (after three years' service in the appointment, and 30 years' service)	Yearly. £1125 Daily.
	£ s. d.
Surgeon-General	2 0 0
Colonel	1 15 0
Lieutenant-Colonel, or Surgeon-Lieutenant-Colonel of the House- hold Troops—	
After 20 years' service	1 0 0
" 25 " "	1 2 6
" 30 " "	1 5 0
Lieutenant-Colonel, after having been in receipt of the increased pay (5s. a day) for 3 years; or Brigade-Surgeon-Lieutenant- Colonel of the Household Troops—	
Under 30 years' service	1 7 6
After 30 " "	1 10 0

INDIAN MEDICAL SERVICE.

A Lieutenant may be promoted to Captain on completion of three years' full-pay service from date of first commission; but after completing eighteen months' service, and before promotion to the rank of Captain, he will be

required to pass an examination in military law and military medical organisation, the result of which may affect his promotion.

A Captain is promoted to Major on completion of twelve years' full-pay service.

A Major is promoted to Lieutenant-Colonel on completion of eight years' full-pay service as major.

All promotions from the rank of Lieutenant-Colonel to that of Colonel, and from the rank of Colonel to that of Surgeon-General are given by selection for ability and merit.

PAY.

The following are the monthly rates of Indian pay drawn by Officers of the Indian Medical Service from the date of their arrival in India :—

Rank.	Unemployed Pay.	Grade Pay.	Staff Pay.	In Officiating Medical Charge of a Regiment.	In Permanent Medical Charge of a Regiment.
	Rs.	Rs.	Rs.	Rs.	Rs.
Lieutenant	420	350	150	425	500
Captain	475	400	150	475	550
„ after 5 years' service	475	450	150	525	600
„ after 7 years' service	—	500	150	575	650
„ after 10 years' service	—	550	150	625	700
Major	—	650	150	725	800
„ after 15 years' service	—	750	150	825	900
Lieutenant-Colonel	—	900	350	1075	1250
„ „ after 25 years' service	—	900	400	1100	1300
Lieutenant-Colonel specially selected for increased pay	—	1000	400	1200	1400

The principal administrative appointments are held by Colonels and Surgeon-Generals on the following consolidated salaries :—

Colonels, from Rs. 1800 to Rs. 2250 per mensem.

Surgeon-General 2 @ Rs. 2200

„ 2 @ Rs. 2500

„ 1 @ Rs. 3000

Specialist pay at the rate of Rs. 60 a month is granted to officers below the rank of Lieutenant-Colonel who may be appointed to certain posts.

The salaries of other substantive medical appointments in the Civil and Military Departments are consolidated, and vary from Rs. 400 to Rs. 1800 per annum.

Qualified Officers of the Medical Service are also eligible for appointments in the Assay Department. The salaries of these appointments are from Rs. 600 to Rs. 2250 per mensem.

Officers are required to perform two years' regimental duty in India before they can be considered eligible for civil employment.

Except in the administrative grades, and in certain special appointments, medical officers are not debarred from taking private practice. No officer, however employed, can receive any staff allowance unless he has passed the examination in Hindustani known as the "Lower Standard."

Retiring Pensions and Half-Pay.

Officers of the Indian Medical Service may retire on the following scale of pension :—

After 30 years' service for pension					Per Annum.
					£700
"	25	"	"	"	500
"	20	"	"	"	400
"	17	"	"	"	300

All officers of the rank of Lieutenant-Colonel and Major are placed on the Retired List when they have attained the age of 55 years, and all Surgeon-Generals and Colonels when they have attained the age of 60 years.

Officers placed on temporary or permanent half-pay are granted the British rate of half-pay of their military rank as under :—

RANK.	RATES OF HALF-PAY.			
	Per Diem.		Per Annum.	
	s.	d.	£	s. d.
Lieutenant-Colonel	11	0	200	15 0
Major	9	6	173	7 6
Captain	7	0	127	15 0
Lieutenant	3	0	54	15 0

MEDICAL APPOINTMENTS IN THE COLONIES.

APPLICANTS for medical appointments in British Guiana, Jamaica, Trinidad and Tobago, Windward Islands, Leeward Islands, British Honduras, Fiji, Ceylon, Straits Settlements, Sierra Leone, Gambia, Gold Coast, Lagos, Northern and Southern Nigeria, Malay States, Hong Kong, Mauritius, Seychelles, Gibraltar, Cyprus, St. Helena and the Falkland Islands, must be between 23 and 30 years of age, must be doubly qualified, and preference will be shown towards those who have held resident hospital appointments. Applications for medical appointments should be sent to the Assistant Private Secretary, Colonial Office.

Information regarding medical appointments in Cape Colony and Natal can be obtained on application to the Agent-General to the Cape, 100 Victoria Street, London, S.W., and the Agent-General for Natal, 26 Victoria Street, London, S.W.

Medical appointments in Rhodesia are made by the British South Africa Company, 2 London Wall Buildings, E.C. ; those in the Transvaal and Orange River Colonies are made on the recommendation of the Governors of these Colonies.

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EDINBURGH MEDICAL JOURNAL.

EDITORIAL NOTES.

The Staffs of Voluntary Hospitals and the Insurance Act. THE members of the honorary staffs of voluntary hospitals are placed in a position of some difficulty in relation to the "pledge complementary to the undertaking of the British Medical Association" which has recently been circulated for signature. It must be pointed out, however, that this difficulty has not been created by the issue of the supplementary pledge: it is inherent in the conditions of hospital work, and will continue to exist whether the pledge is signed or not. Nor does the existence of the difficulty indicate any want of unanimity amongst the different sections of the profession. Consultants and members of hospital staffs are as determined as the great body of general practitioners that the policy of the profession shall prevail, but circumstances make it necessary that they should take different means to ensure this object.

No member of a hospital staff who intends to remain loyal to the profession in the stand it is making can have any hesitation in subscribing to the principle embodied in the third paragraph of the undertaking—the principle that the charitable hospitals of the country shall not be exploited for the purpose of defeating the policy of the medical profession in regard to the administration of the Act.

It seems to be generally recognised, even by those who are responsible for the terms of the undertaking, that it has not been skilfully drafted, and it is easy to imagine circumstances under which a literal adhesion to the wording of the pledge would compel a signatory to defeat its primary object. In this lies the main obstacle to a uniform pledge being given, and under such circumstances we can see no objection to members of hospital staffs so amending the terms of the pledge as to make it consistent with their desires and intentions, and so long as the spirit of the undertaking is retained such adhesion will have all the moral effect that is desired. That the consultant section must and will stand in with the main body of practitioners is beyond doubt. The whole-hearted unanimity with which the practitioners of the country have agreed, not only to refuse to accept contract practice under the Act, but even to resign such contract appointments as they hold—and this in many cases jeopardises the main source of their income—renders it impossible for others to withhold their support.

Another difficulty which we think has not been fully appreciated by those responsible for the drafting of the pledge lies in the fact that the members of a hospital staff are under certain obligations to the managers of the hospital, and through them to the public.

A person who attends a charitable hospital does so ostensibly on the grounds that he is unable to pay for medical advice and treatment, and to refuse to render professional service to such a person is to depart from the best traditions of our profession, and to fail in an obvious and primary duty. In his capacity as medical officer to the charity a member of the staff can take no cognisance of the patient's legal position as an "insured person" or otherwise. It is, of course, true that an "insured person" under the Act has no claim to treatment in a charitable institution. By the terms of his contract with the State he is entitled to medical attendance or to a monetary equivalent which will enable him to obtain such attendance outwith charity.

It appears to us, therefore, that the altered conditions brought about by the Act render it imperative that the managers of our voluntary hospitals should take immediate steps to prevent any abuse of their institutions, and to ensure that the funds at their disposal shall not be expended on those who have already provided for illness by becoming insured. This they owe to the charitable public who provide the funds, no less than to the members of the honorary staff who give their services for the benefit of the poor. The managers may trust the members of the staff to take care that such regulations as they make shall not be strained, and that no necessitous person shall be allowed to suffer from any punctilious interpretation of the law laid down.

It is a matter of common knowledge that already the resources of our charitable hospitals are being taxed to meet claims established by recent legislation, such as the Workmen's Compensation Act and the Inspection of School Children, and under the Insurance Act this abuse threatens to be increased to an enormous extent.

With regard to the section of the pledge which deals with the question of co-operation between consultants and those who, for want of a better term, we may call "non-conformist" members of the profession, there seems to be less difficulty. Much as we desire to avoid even the appearance of trades-unionism, we feel satisfied that, except in cases in which there is danger of the patient suffering, the circumstances which have been thrust upon us justify those who support the policy of the profession in declining to co-operate with those who are bent on defeating that policy.

**The Mental Deficiency
Bill.**

THE legislation which was rendered inevitable by the Report of the Royal Commission on the Feeble-minded is at last forthcoming. A Bill has been introduced by the Home Secretary having as its short title the

"Mental Deficiency Bill," and seeing that it is a measure which is as urgently required as it is (in the party sense) non-controversial, we may justifiably hope that time will be found this session to pass it into law. The definition of mentally defective persons, for the purposes of the Bill, is extremely comprehensive. It follows closely the form adopted by the Royal Commission—idiots, imbeciles, feeble-minded, moral imbeciles—but in addition thereto includes persons who, through mental infirmity of age, are incapable of managing their affairs. Persons belonging to any of these classes fall to be dealt with under the Act under certain circumstances: (*a*) if neglected or cruelly treated; (*b*) if charged with crime, undergoing imprisonment, or detained in a reformatory; (*c*) if habitual drunkards; (*d*) if children discharged at 16 years from a special school, provided due notice has been given; (*e*) if it is desirable to prevent them from propagating the species; or (*f*) if for special reasons it is advisable they should be dealt with. All such persons are now placed under the control of a new central authority, the Commissioners for the Care of the Mentally Defective, among whose duties are the supervision of institutional and other care of defectives, the provision of institutions for dangerous defectives, the administration of Parliamentary grants, and the co-ordination of local committees. These local committees are also set up by the Act (in Scotland they are to be appointed by the district Lunacy Boards): they will, with the assistance of specially qualified medical officers, register all defectives in each area, supervise them under guardianship or in institutions, provide the necessary accommodation, and report to the central authority.

The Bill, therefore, provides machinery for the effective permanent control of a large proportion of the feeble-minded, and it will rest with the local committee to make this control and supervision a real thing. One feature of the Bill which will assuredly be subject to criticism is the erection of a new central authority instead of extending the powers of the present Commissioners in Lunacy. No doubt further explanations as to the reasons which dictated this policy will be forthcoming when the measure is under discussion.

In several directions the Bill is more sweeping than had generally been anticipated. The inclusion, for instance, of senile mental defect was unexpected, and it is not apparent why patients of this class should be placed under the care of the new authority instead of remaining under the Lunacy Commissioners. Possibly the idea of the framers of the Bill was to withdraw from these persons the stigma of certification as lunatics. The greatest advance on the existing law, however, is in connection with the propagation of children by defectives. This is guarded against in two ways: In the first place, a feeble-minded person can be deprived of his liberty for this and no other reason. Unquestionably this is a long step in the right direction, because many of the

worst offenders in this respect are women who are more or less able to fend for themselves, and therefore go unnoticed because they belong to the upper grades of mental defect. It is notorious that cases of this kind are much more likely to escape control than more obviously feeble-minded persons. A second safeguard is afforded by the Bill, which makes it a misdemeanour to marry, or to connive at the marriage of, a mentally defective person within the meaning of the Act. This is probably the first piece of eugenics which has ever been incorporated in an Act of Parliament. Doubtless the Bill is susceptible of amendment and improvement, but even as it stands it is a much-needed piece of useful legislation, and we sincerely trust that it will pass through Parliament during the present session and come into operation next year.

The Renaissance of Mendelism.

THE rediscovery of Mendel's work has not only led to a repetition and extension of his experimental crossings, but also to a retesting of the various contributions to the theory of evolution by Darwin and Weismann, especially in their applications to the establishment of sound heredity qualities in mankind. Darwinians are at present engaged in explaining how variations arise, and how, when due, as they believe, to natural selection, they are made causal in the germ-plasm and thus transmitted. As they assume that the great causes of variation are extrinsic, ignoring any intrinsic mechanism in the germ plasma and as further they hold to the origin of the germ-cells from the somatic ones covering the sexual gland, their position is a difficult one, but they may be left at present to struggle on indomitably, if as yet ineffectively.

The continuity of the germ plasma, first clearly indicated by Galton and Weismann, has been a great advance, and in its more modern form of the continuity of the germ and sperm cells is now rapidly winning adherents all over the world, with the exception of our own country; and if we add as a corollary the origin of these germ and sperm cells from an early division of the fertilised ovum, so that new qualities introduced by fertilisation and thus expressed in the zygote can be transmitted, the whole question of heredity becomes clearer—only that which is placed in the zygote can be handed on, as it is from an early division of the zygote that the primitive germ and sperm cells arise. Mendel's work came opportunely, and was enthusiastically received after many years of neglect. The ratios he established and the theories of dominance and recession at once appealed to all, and up to the present, dominance and recession have been used as the *Diù ex machinà*, over which the Mendelian shouts "Eureka."

If, however, we consider carefully an elementary plant-crossing, it is to be noted that all one can say as to the dominance of a quality

is that it means that one of the two contrasted unit characters is expressed first in the body of the plant or animal to the exclusion of the other quality, termed recessive. In the second and subsequent generations the two contrasted qualities are on the same footing, and become segregated out in the plant in a probability ratio. Thus in the plant the dominant quality is merely the first to be somatically expressed, from its power of excluding the recessive quality from that part of the zygote giving rise to the soma of the organism. We cannot therefore strictly speak of the power of dominance as being exclusive in generations subsequent to the first. When we apply the theories of dominance and recession in mankind, this must not be forgotten, as in all our cases, practically the generations are subsequent to the first in which the new unit character was expressed.

What is important in Mendelism is the autonomy of the unit characters. Once introduced they go on as such and cannot be counteracted. Another important fact is that in a first generation of a plant crossing the introduced qualities are placed in a probability ratio in the egg-cells and pollen grains, one quarter of each containing one of the new characters pure, one-half both. Thus plants arise, a quarter of each showing one quality pure, while a half have both, in their egg-cells and pollen grains, this half giving a 3:1 ratio of plants with the contrasted qualities expressed in them in this proportion. After such a crossing, therefore, each contrasted quality is tested in a pure form in one-fourth of the plants, while in a half of them the experiment is again repeated.

The well-known debate in the Royal Society of Medicine was permeated with the theories of dominance and recession, but the enthusiasm with which the debaters threw these terms at one another would have been much mitigated if the views already given as to their significance had been realised.

Galton's law and Mendelism really differ in this, that Galton gave definite fractions of transmission, while Mendel's segregation is in a probability ratio. Galton's figures hold for three generations and make no allowance for the appearance of belated characters, so called atavism. Statistics of measurements of the bodily organs do not give Galton's fractions but always some form of frequency polygon.

Dr. Mott has written sanely and accurately on hereditary transmission, but is least happy in regard to Mendelism. He uses the ordinary terminology of what he calls tall gametes meeting with short "twice as often as either short with short or tall with tall,"⁷ whereas what happens is a mingling of the determinants for shortness with those for tallness, in the zygote, and a redistribution of them in a probability ratio between the part of the zygote that is to become

The expression of one of the speakers at the debate at the Royal Society of Medicine.

the plant and the part that will give rise to the pollen grains and egg-cells. Dr. Mott also speaks of "there being characters of tallness and shortness in each gamete," a quite correct statement, but a violation of the supposed purity of the gametes, the alleged corner-stone of Mendelism. In this Dr. Mott is, so far as one can judge, unconsciously accurate and heretical among English Mendelians. Many other points are raised in this interesting paper, but we must hasten on to the third on our list by Rosanoff and Orr.

These investigators make a bold attempt to explain the heredity of insanity on the theory that insanity is recessive, in the generally-accepted Mendelian sense, to the normal mental condition which they consider to be dominant.

One must therefore scrutinise their definitions of dominance and recession, and also what they consider to be the transmissible Mendelian unit character. They accept Weismann's terminology of causal determinants or determiners in the germ plasma, and state that "with reference to any given character the condition in an individual may be *dominant* or *recessive*; the character is dominant when, depending upon the presence of its determiner in the germ plasma, it is plainly manifest; and it is recessive when, owing to the lack of its determiner, it is not present in the individual under consideration."

This definition is an erroneous one, as when a so-called dominant or recessive unit character is expressed in the soma of a plant or an animal, it is so because its determinants were present in the gametes giving rise to it. To say that a recessive quality is not expressed in the soma of a plant or animal because its determiners are not in the germ plasma of its gametes leads naturally to the conclusion that this recessive quality is present neither *in esse* nor *in posse*. The real sense in which we understand dominance and recession has already been given, and does not support the definition of the authors.

One cannot possibly consider neuropathic conditions as recessive unit characters. The evident Mendelian unit characters are simple structural conditions as in brachydactyly, eye-colour, achondroplasia, and these malformations or variations are due to the absence of some causal determinants, probably of the nature of hormones. The complex conditions underlying neuropathic conditions ranging from hysteria to serious insanity cannot be in any way compared to such.

The results as to various meetings of normals and abnormals are given, as one finds, in a simple tall-dwarf-crossing, where self-fertilisation takes place in the first and subsequent generation, and results like the following are enumerated:—

"f. Both parents being normal and of pure normal ancestry, all the children will be normal and not capable of transmitting the neuropathic

make-up to their progeny." How could they if the parents are normal on both sides, and have therefore no neuropathic make-up?

"c. One parent being normal and of pure normal ancestry, and the other parent being neuropathic, all the children will be normal but capable of transmitting the neuropathic make-up to their progeny."

This is an application of the ordinary plant-crossing, and its results in F₁, where one contrasted quality is alone represented in the body of the plant, while in the subsequent generations the two contrasted qualities separate out in a probability ratio. The neuropathic make-up is so varied in extent that any idea of ratio is out of the question. We may sum up on this by saying that the conception of Mendelism the authors have formed is so erroneous, and their use of the term neuropathic constitution so wide, that no real scientific deduction can be made from their data.

It may be naturally asked in conclusion, Can the alienist get any help from the modern ideas of heredity? Certainly he can.

1. Weismann and Galton's continuity of the germ plasma is most important. An insane strain goes on *in esse* or *in posse* from generation to generation.

2. The importance of Mendelism is the autonomy of unit characters, and, therefore, the serious conclusion that one unit character is not counteracted by another, but each segregates out in some as yet unknown ratio so far as the neuropathic make-up is concerned.

3. The curative mechanism in insanity is the persistent swamping of bad qualities with good ones. Marriages with marked neuropathy on both sides are criminal.

What Drs. Rosanoff and Orr should do with their material is to think over again their definitions of dominance and recession, weed out many of the constituents of the neuropathic make-up, and thus obtain from their painstaking work some real results and not the present simplicity of error.

Portrait of Dr.
R. W. Phillip.

THE occasion of the twenty-fifth anniversary of the inauguration of the Royal Victoria Dispensary has been considered by the friends of Dr. Phillip

a fitting opportunity to mark their appreciation of the pioneer service he has rendered to the progress of anti-tuberculosis work. It is proposed to ask Dr. Phillip to sit for his portrait, which will be placed in the hall of the Dispensary. The honorary treasurer to the fund is C. E. W. Macpherson, Esq., C.A., 6 North St. David Street, Edinburgh.

Edinburgh Post-Graduate Courses.

THE success which has hitherto attended the post-graduate courses in Edinburgh has encouraged the Executive Committee to extend the scope of their work by instituting a special course on "Diseases and Defects of Children" which is primarily intended to meet the requirements of Medical Inspectors of School Children. The course, which extends from the 15th to the 27th July, will be largely conducted in the Royal Hospital for Sick Children, where medical, surgical, and out patient clinics will be held. In addition six clinics will be held in the Skin Department of the Royal Infirmary, four at the Ear, Nose, and Throat Department, six in the Eye Department, and two in the Dental Department. Demonstrations on Anthropometric Methods will be given in the Anatomical Department of the University, and three clinics on Mental Defects in Children will be held in the Institution for the Education of Imbecile Children at Larbert. There will also be eight special lectures on general questions relating to physical defects of children, methods of medical inspection, etc. The number of graduates attending this course will be limited to twenty-five.

The August course on "Internal Medicine," will be conducted on the same lines as in previous years: three demonstrations on Pulmonary Tuberculosis will be given at the Royal Victoria Hospital for Consumption.

The "General" and "Surgical" courses and numerous special classes will be held during September. The Committee recommend that advantage be taken of arrangements which have been made whereby those attending the September courses may obtain accommodation and board in one of the residences of the University Hall. All the courses are open to women. A detailed syllabus and all information may be had from The Secretary, Faculty Office, University New Buildings.

Appointments.

THE University Court have appointed Dr. J. J. Graham Brown University Lecturer on Neurology, and Dr. Harry Rainy University Lecturer on Physical Methods in the Treatment of Disease.

ATAXIA: A SYMPTOM.

BEING THE SECOND OF THE MORISON LECTURES, 1912.

By J. J. GRAHAM BROWN, M.D., F.R.C.P.,

Physician to the Royal Infirmary : Lecturer on Neurology, University
of Edinburgh.

II.

IN the preceding lecture the reflex arc was investigated. We then found that its afferent neurone takes origin in muscle-spindles and in the tendon-organs of Golgi, that it has its cell in the ganglion on the posterior nerve-root, and that, entering the cord, it gives off the reflex collateral which, swinging through the posterior column, passes to the grey matter of the anterior horn where the synapse is situated. We also considered the efferent or motor neurone of the arc—the “final common path”—which, commencing in the dendrites of the anterior cornual cell, finds its effective apparatus in the motor end-plate in muscle. The stimuli which unceasingly pour through the arc pass, therefore, from muscle through the synapse in the cord, back to muscle again. These are stimuli of muscular sense. They are subliminal, never reaching consciousness.

But up to this point we have confined our consideration to such stimuli as pass through the fibrils of the reflex collateral. There are many other collaterals, many other pathways, many other sets and varieties of neurones in the posterior nerve-root. What have they to do—have they indeed anything to do—with muscular sense? And this brings us to another and very important question—*What do we mean when we speak of muscular sense?*

Clinically, when we use the term “muscular sense,” we mean that congeries of impressions which informs the centres of the position of limb in space, of the state of its muscles as regards contraction and relaxation, of the state of the joints as regards flexion and extension, adduction, abduction, pronation, supination, etc. From moment to moment such conditions must vary, and these fluctuations and mutations, of an infinite variety, must, as they occur, be instantly reported upon if a regular, effective, and steady co-ordinated movement is to be carried out. It should be borne carefully in mind that these afferent impressions are for the most part not perceived. They do not reach consciousness. This occurs not only because they lie beneath the limen, but because

they are in many cases not transmitted to the sentient cortex at all.

We are not now considering the reflex arc alone. We have to think also of the other centres—of the cerebellum, of the basal nuclei, and of the cerebral cortex. Movement may be directed from any or all of these, and in each case the co-operation of muscular-sense is absolutely essential.

What are the impressions, then, which go to make up MUSCULAR SENSE? From what has been said, it is obvious that those special stimuli to which the spindles and Golgi organs are attuned, and which these delicate receptors have selected, are all important.

But there are other structures in the limb from which useful impressions might well arise. From fasciae, aponeuroses, and ligaments no doubt such stimuli do take origin; but these must be considered as comparatively unimportant and wholly ancillary in this regard to muscle and tendon-organs.

What, however, of the joints, from the articular surfaces of which muscular sense stimuli might be supposed to arise? Some years ago Goldscheider made elaborate investigations into the question of the conditions of perception of passive movement at various joints, making his measurements in terms of angular movements at a certain and fairly uniform speed. Speaking generally, the liminal excursion was found by him to vary with each joint, ranging from 1·3° of arc downwards to 0·4°, or even less. It is rather striking and even suggestive to find that the delicacy of perception was on the whole finest in the large proximal joints (such as the shoulder) and less fine in those lying distally.

If this articular sense, as it has been called, were of a high importance, we should certainly have expected that those stimuli which are connected with the fine movements of hands and fingers would be most highly developed and most delicately exact. This is, however, not the case, for movements at the shoulder are perceived with more than double the delicacy of those at phalangeal joints.

These passive joint-movements and their measurement by Goldscheider are, as we shall see presently, of great use in determining clinically the presence or absence of ataxia. In using them, however, it seems clear that we are really measuring the perception of stimuli from the muscles and tendons which are more or less moved at the same time. The perception must therefore depend on the degree of muscular tonus present in each case,

and one may well suppose that the muscular support which the shoulder-joint needs will necessitate the maintenance of a higher muscular tonus there than that which is required in connection with the wrist and fingers.

You may say that this is mere theory. There are, however, certain facts which go a long way in support of such a view. The joint surfaces are not provided with any rich nerve supply. No doubt Ruffini's corpuscles are to be found in connection with articular ligaments and in the fibrous structures of the joint generally,



FIG. 1.—RUFFINI'S CORPUSCLE, FROM LIGAMENT OF KNEE (SFAMENI).

just as they are to be found in many fibrous tissues elsewhere throughout the body, and Krause's bodies are occasionally to be seen in the synovial membranes; but, speaking generally, the articular structures do not possess receptors in any abundance, and those that do exist there fail to show the high specialisation of those of muscles and tendons. This certainly goes against the view that any complex or delicate afferent impressions are derived from joint surfaces.

It is no doubt true, as Goldscheider has pointed out, that feeble reflex movements may be elicited by striking the articular ends of bone, but their starting-point is not in the joint, for it has

been shown by Sternberg that they persist after all nerves from the ends of the bone have been cut. The shock of the stroke causes the bone as a whole to vibrate, and nerve-endings at distant points are thereby excited, just as they would be excited by a vibrating tuning-fork.

It is also true that the accuracy of the perception of passive movement is diminished when the joint surfaces are separated by forcibly extending the limb. But this hardly proves anything, for, clearly, in such an experiment the muscles and tendons which actuate the joint are under quite abnormal conditions, are suffering a variety of deformation to which they are never normally subjected, and to which their receptors are neither accustomed nor attuned to respond.

On the other hand, we have distinct evidence that reflex co-ordination, at any rate, does not arise from articular surfaces. In the spinal dog Freusberg pointed out that passive movement of one leg evoked reflex movements in the other, and Sherrington has recently shown that these reflex co-ordinated movements are not interfered with when the joints of the limbs are fully anaesthetised.

Still more recently confirmation of this has been published by Magnus in the series of observations to which reference has already been made. He found that the reversal effect* was not in any way altered by cocainising the joints. He used stovain in one instance, subsequently novocain, and clearly proved that the curious reversal effect had nothing to do with afferents from articular surfaces.

We may therefore safely conclude that if afferent stimuli from joints participate at all in the function of co-ordinate movement, they do so only to a limited and altogether unimportant and negligible extent.†

We shall see presently that the perception of bone vibration, which occurs when a vibrating tuning-fork is applied, possesses much clinical interest and is of some diagnostic value: but one can hardly suppose that the stimulation of deep afferents from the bones of the limb can possess importance from the point of view of co-ordination.

* See previous number of this *Journal*, p. 496.

† The afferents from joints are, of course, frequently enough affected in morbid processes. The deep sensory receptors and afferents conveying pain, for example, are obviously thrown out of function in tabetic cases in which arthropathy has occurred.

What has just been said regarding afferents from articular surfaces applies to a considerable extent to the nerves of the skin. The spinal co-ordinating reflexes are not affected by section of all the cutaneous nerves of the limb. They occur with just as great exactitude after that operation has been performed as they did before. These recent results only confirm the deductions which have been drawn from many older observations. In the frog, for example, section of the posterior roots causes marked ataxia in the apæsthetic limbs. No such result follows removal of the skin of the limb. In a bird the most accurate co-ordination must be in action while he sleeps balanced on one foot. Yet no disturbance of that co-ordination takes place after the skin of that foot has been rendered anæsthetic by nerve section. In a horse the condition of tenderness of the hoof is removed sometimes by cutting sensory nerves; thereafter he will trot quite naturally. Cocainisation of the vocal cords does not in any way interfere with the management of the voice.

The whole experimental evidence therefore goes to show that in animals, at any rate, co-ordination, so far as afferent stimuli are concerned, is performed by means of these highly differentiated receptors—the muscle-spindle and the Golgi tendon-organ.

In man, so far as clinical evidence goes, much the same statement may be made, though not perhaps quite so absolutely. There are many instances of tabes on record in which marked ataxia was present while cutaneous sensibility remained unimpaired. I have myself had several such cases under observation, and I show you a tracing of the footsteps of one case of the kind which indicates that the gait was markedly ataxic even although the patient was at the moment being helped in her walk by the guiding hand of a nurse. No blunting of any of the forms of cutaneous sensibility could be detected. (See Fig. 2.)

The skin sensations cannot therefore effectively replace the afferent impressions of the true muscular sense. Still, in man, it is undoubtedly the case that if the skin of a limb is anæsthetic there is some impairment of co-ordinated movement, though that impairment is slight. Those who argue in favour of the importance of the presence of cutaneous sensibility in the act of standing and balancing, usually rely on observations which indicate that such balancing is to some extent interfered with if the skin of the soles is subjected to extreme cold. In using this argument they forget that it is not possible to chill the sole without also chilling the small muscles of the feet. These small muscles are peculiarly

rich in their supply of receptors—muscle-spindles—which are therefore simultaneously affected by the depressing influence of cold.

We may conclude, then, that by muscular sense we mean those specialised impressions which are selected by the muscle-spindles and by the tendon-organs of Golgi. The cutaneous receptors and their afferent fibres can only come in vicariously, and that to a slight, almost negligible, extent.

We now pass on to the consideration of what are the *Performances of Muscular Sense*.

These performances are threefold, in so far as consciousness is concerned, for the stimuli from spindle and from tendon-organ bring to us—

- (1) knowledge as regards the posture of the limb;
- (2) knowledge of the extent and direction of passive movements;
- (3) knowledge of the same kind regarding active movements.

When muscular sense is completely lost there shows itself that curious form of so-called senso-paralysis to which reference has already been made. This completeness of loss rarely occurs in the human subject. What we do see clinically are the effects of partial loss. These show themselves in two forms—(1) ataxia, (2) atonia.

AN ATAXIC MOVEMENT due to impairment of muscular sense does not necessarily involve any loss of gross muscular power. What the term ataxia does imply is that there is a more or less complete want of co-ordination in the details of the movement.

The movement, be it voluntary or be it automatic, is no longer performed with accuracy, nor, even if it does ultimately fulfil its purpose, can it do so without needless dissipation of neuro-muscular energy.

The ataxic movement is—

- (1) Inexact in *direction*.
- (2) The *distance* through which movement is to take place is incorrectly judged, *i.e.*

FIG. 2.

the initial position of the limb is not correctly known.

- (3) The *muscular effort* required in order that the limb should move through that distance is misjudged. The motor stimulus is not correctly adjusted—is usually excessive.
- (4) The *muscular rhythm* is not harmonious, that is, the grading of contraction and relaxation as well as the grading of synergy are not consonant, and therefore the symphony of movement is lost.
- (5) If one watches a movement of this kind it is easy enough to see that its velocity is not uniform—is in many cases far from uniform—the speed varying from instant to instant as the movement proceeds. On the other hand a normal movement is a steady one. Loeb and Korányi have shown that a natural-willed movement is uniform in speed from soon after its start until just before its completion.

It follows, therefore, that an ataxic movement of the hand and arm is wavering, jerky, uncertain, ineffective, the finger missing the point aimed at more or less widely and usually being carried too far. In the legs, ataxia gives rise to a gait which is more or less irregular, the patient swaying, tottering, reeling or staggering as he attempts to walk.

It is to be remembered that ataxic movements are usually capable of being corrected to a greater or less extent by means of the visual apparatus. This point, which is a very important one, will presently be referred to in some detail.

The ataxic movements which are seen in tabetic patients may now be more particularly referred to. The afferent impressions of muscular sense from the muscles and tendons of the limbs are much diminished in intensity in such cases, many of the afferents having undergone degeneration. As a result of this the co-ordinating centres are being imperfectly—indeed incorrectly—informed as regards (1) the posture of the limb, and (2) the condition of its muscles.

Hence the orders which these centres issue, *i.e.* the efferent motor impulses, being founded on this defective information, are themselves incorrect. They usually err on the side of exaggeration. This is well illustrated in the stamp of the heel, which is so characteristic of the tabetic gait. Moreover, the movement, as it proceeds on its incorrect course, cannot be automatically

corrected, for the reason that the afferent impressions are defective.

The condition thus produced may aptly be compared to that which is noticeable in the conversation of a deaf man. He talks loudly because his auditory impressions are weak and imperfect. He does not moderate his voice because he is not aware that he is speaking loudly.

Loss of muscular sense leads not only to these errors in active movement, it also involves impairment of the sense of posture of the limbs.

To know—consciously or unconsciously—where one's leg, for example, is at any moment is one of the performances of muscular sense; even in the normal state that knowledge is not quite perfect. Lying in bed at night and after a period of muscular relaxation and quietude, some persons at any rate have difficulty in realising the exact position of the toes, though the slightest movement will give instantly the required information.

In the ataxia of tabes matters are altogether different. The patient not only cannot be sure of the exact position of the toes, he does not know even roughly the posture of the limb as a whole.

One of the further clinical effects of loss of muscular sense is a certain laxity of the joints, often seen in tabetic cases, and known as *hypotonia*. This is, in the first instance, the direct result of the lowering of the muscular tonus—*atonia*. The muscles which normally afford support to the joint are now so relaxed that they can no longer do this. Hence the joint moves loosely, and this greater amplitude of movement, passing beyond the normal degree of excursion, leads to overstretching of the ligaments and fibrous articular structures. These give way and thus the possibility arises, in such cases, of movements more unnatural and more bizarre even than those of a skilled contortionist. Indeed the training of a contortionist follows something of the same course. He has to learn from early youth to relax his muscles, and by constant and even painful practice to stretch the ligaments of these joints, by means of the laxity of which he hopes to achieve his triumphs.*

The hypotonia resulting from loss of muscular sense must not

* No doubt in certain instances of tabetic hypotonia the laxity is not entirely due to the causes mentioned. Organic changes in the articular tissues, similar to those met with in Charcot's arthropathy, co-operate in some cases to produce the effect.

be confused with that form which one sees so often in cases of poliomyelitis anterior acuta in the years which follow the attack. The cause which actually produces the articular laxity is here the same, *i.e.* atrophy and loss of tonus in the paralysed muscles. But that atrophy and atonia result in this case from lesion of the motor side of the reflex arc.

TESTS OF MUSCULAR SENSE.

From what has been said previously it must be obvious that in the presence or absence of muscular tonus we possess a means of measuring, however roughly, the afferent impulses of muscular sense on which that tonus so largely depends.

1. *Deep Reflexes.*—The readiest way in which this muscle-tonus can be tested clinically is by means of the deep reflexes. The knee-jerk is that which is most commonly used, although as far as the lower limb is concerned the ankle-jerk is even more important, for in many tabetic cases it disappears at an earlier stage of the disease than does the patellar phenomenon.

If, however, we are to use these jerks as a means of measuring the muscular tonus, and through it the vigour of the afferent impulses of muscular sense, we must necessarily exclude all changes in the muscle itself, such as the various forms of muscular dystrophy. We must also exclude such morbid processes as are capable of depressing the vitality of the efferent side of the reflex arc—the motor neurone—or even of destroying it.

Moreover, it has to be borne in mind that there are some poisons, such as alcohol, which act differently on the reflex arc in different individuals, in one affecting chiefly the motor neurone, in another chiefly the afferent, while in a third case both neurones may be equally involved. Much the same thing may be said of certain metallic poisons and of the toxins of various diseases—diphtheria and the like—which produce a peripheral neuritis. There are also certain diseases, particularly ataxic paraplegia, in which as regards the knee-jerk the morbid process has a double effect, leading, it may well be, to diagnostic confusion and even to error. In this disease there is always an interference with muscular sense, the afferent impressions which constitute that sense being interrupted. But at the same time the pyramidal tracts are also involved, and consequently the cortical inhibition is removed from the reflex arc. Thus we have two opposed influences in action, one tending to diminish the knee-jerk, the

other to increase it. What will happen in any individual case depends on the relative amount of disturbance in these two opposing forces.

2. *Hypotonia* is another evidence of the failure of muscular sense, depending as it does upon loss of tonus in the muscles concerned. This, which is best seen in connection with the knees, is a common and, in its slighter manifestations, often an early symptom in tabetic cases. But before due weight can be given to the presence of hypotonia as an evidence of loss of muscular sense, those other conditions which have been already mentioned as capable of producing it must be excluded.

3. *Perception of Posture* is not quite accurate or perfect even in health, as has been already said. After a period of quietude the exact position of the toes may not be realisable in consciousness. The position of the other segments of the limb is, however, always perceptible in normal people.

Where muscular sense is deficient, this perception is proportionately diminished, and it therefore provides us with a useful test. The patient lies on his back in bed with closed eyes. We place one limb in some particular position, then, after distracting his attention by conversation for a minute or two, we ask him to indicate the position of the limb. This can be done either by telling him to place the other limb symmetrically, or by making him point to some particular part of the limb, say, the great toe.

4. *Perception of Passive Movement*.—This test, which is a very good one for clinical purposes, consists in the measurement of the smallest angular movement in connection with each joint which the patient can perceive. Instruments are made for the purpose of determining the exact amplitude of such movements in terms of degrees of arc. As a rule they can be dispensed with in ordinary clinical work. But in conducting this test there is one considerable source of error which requires special attention. At the moment one is making the passive movement at any joint one is apt to put additional pressure on the tissues which one is grasping. This, being perceived by the patient, may be mistaken by him for a joint movement. It is easy to eliminate this error. The observer need only vary his procedure to this extent, viz. that he sometimes presses and bends the joint, and at other times presses without bending. The answers the patient gives in each case will obviate error.

Reference has already been made to the true source of this power of appreciating passive joint movements. Clearly it is not

an articular sense—a stimulus, that is, arising in connection with joint surfaces. The stimuli which give rise to this sensation have their origin in the spindles and tendon-organs in those muscles which, though passively relaxed, are yet moved when the joint is flexed or extended. The measurement of the angular movement perceptible in health has already been given in terms of arc.

5. *Perception of Active Movement.*—This test is carried out by asking the patient, whose eyes are closed, to make, say, with forefinger or thumb, the smallest movement possible to him. That means, of course, the smallest movement which he can perceive as a movement. The observer will compare the result with that discoverable in a healthy subject.

There is another way by means of which an attempt is sometimes made to estimate the degree of perception of active movement, viz. by the judging of weights lifted in the hand or raised by the foot. This is in my opinion not a good test, for the muscular sense is not by any means the only sense which comes in to direct the judgment. There is, for example, the latency of the movement, the interval between the instant at which the will impulse starts and the actual commencement of the act of raising it. This latency is proportionate to the weight. Then there is the momentum of the weight—how sharply can the movement be stopped? The value of these considerations is shown by the fact that it is much easier to detect the difference between two weights if they are raised than if they are merely laid on the hand. It is hardly necessary to point out also that cutaneous impressions help materially in forming a judgment, such as the pressure on the skin and its distortion, nor to allude to the various fallacies to which we are all liable and which render our conclusions erroneous.

6. *Performance of Active Movement.*—The accuracy with which active movements can be carried out is most usually tested by asking the patient, whose eyes are closed, to touch the tip of his nose with his forefinger, or to bring his two forefingers together, or to touch one patella with the other heel.

Romberg's test falls under this heading. It is well to know that the swaying which we observe in ataxic patients when they stand with the feet together and the eyes closed, and which we call Rombergism, is a phenomenon met with, though to a very slight degree, in normal persons. I show you a tracing, taken some eight years ago, which illustrates this point. An old tracing has been selected for the purpose, in order that I might be able

to assure you that the individual from whom it was taken is still perfectly normal, and therefore could not then have been at an early stage of ataxia. The swaying of the tabetic when he closes his eyes, great as it is, is therefore but an exaggeration of a normal condition.

It may be useful at this point to examine a little more closely this most interesting phenomenon. In doing so we naturally ask ourselves the question, Why should swaying commence when the patient closes his eyes? The answer obviously is that vision acts as a vicarious aid in the act of balancing. In other words, the balancing required to maintain the upright position is normally performed by means of the muscular-sense impressions coming from the muscles and tendons which are in action. These impressions suffice for all ordinary purposes, and therefore a normal man can stand fairly

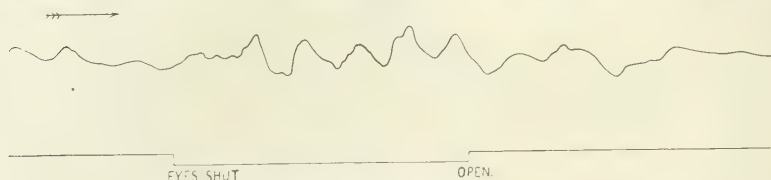


FIG. 3.—TRACING OF LATERAL SWAYING, WHEN EYES ARE CLOSED, IN A NORMAL PERSON.

accurately with closed eyes, can walk into a dark room without any observable difficulty. If, however, he commences to be ataxic, that is if his muscular-sense impressions weaken, he makes use of his eyes to aid him. At first this vicarious aid suffices. He can stand well and walk well, though he will sway quite perceptibly when his eyes are closed. Later, when his afferent neurones have still further degenerated, and when he is depending still more on the help of vision, his gait will be at best uncertain and ataxic, and when he closes his eyes he will fall.

All this is clear enough, but it does not tell us in what way the visual apparatus is of help in the balancing of the body. We want to know why the tabetic patient sways and falls when he closes his eyes. Why does the obliteration of visual perception prevent him from standing or walking?

When muscular sense is defective, vision may help the patient to regulate his movements, and that in two quite different ways:—

(1) He may watch the movement of the limb, observe what is exaggerated or defective, and thereby learn to correct the error.

This use of vision has probably but a slight bearing as regards the question of Rombergism. It is, however, of supreme importance, as we shall see later, in relation to Frenkel's method of re-education of movement in cases of tabes.

(2) He may aid his balancing by fixing his eyes on some object in front of him. The action which now takes place is largely subconscious. If the eyes are fixed, then it is clear that every movement of the head implies a movement round the eyeballs. In other words, it implies contraction of one set of ocular muscles and relaxation of another. In this way muscular-sense stimuli are excited, and we know, especially from the recent observations of Cilimbaris, how richly these ocular muscles are supplied with spindles.

In using the eyes for balancing purposes, then, two things are necessary—fixation, and accurate muscular-sense impressions from

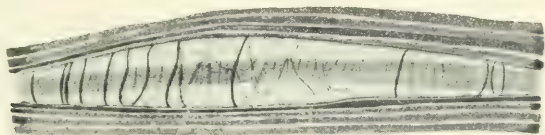


FIG. 4.—MUSCLE-SPINDLE FROM EYE-MUSCLE OF SHEEP (CILIMBARIS)

the ocular muscles. It is a fortunate thing that in tabetics the neurones conveying muscular sense from these muscles are rarely affected, at any rate in the earlier stages of the malady.

But, as has been just said, fixation of the eyeballs is essential. That act is in part conscious, being effected by the medium of the calcarine cortex. But it is also in large measure automatic, and the apparatus by which it is carried out is probably as follows:—As we shall presently see, all muscular-sense stimuli converge on the vermis in order to be co-ordinated in the cerebellum. Thither also pass subconscious visual stimuli from the primary visual centres in the anterior corpora quadrigemina. The path by which they travel is probably by the tecto-pontine tract to the inferior olive, and thence by the restiform body to the vermis. There, or in the cerebellum elsewhere, co-ordination takes place.

In those cases of tabes in which early atrophy of the optic nerves occurs with resulting blindness, the maintenance of the power of walking is probably the result of very careful practice and close attention. The influence of these factors will be referred to subsequently.

7. *Sensation of Fatigue*.—This sensation is much lessened in

cases of ataxia. It is therefore strictly speaking a test or measure of muscular sense. A tabetic, for example, may be able to hold up one leg for ten minutes without feeling much fatigue. But this is not, of course, suitable for employment as a clinical test. Nor are such experiments advisable in the interests of the patient.

8. *The Direct Perception of Muscular Contraction.*—When a muscle is caused to contract by means of faradism, the contraction can be felt by normal persons. When muscular sense is interfered with that sensation is lost. Clinically this test is not practicable.

9. *Perception of Bone Vibration.*—When a vibrating tuning-fork is applied over a bone, say, the tibia, the vibrations are transmitted



FIG. 5.

to the bone, and are thence conducted by deep afferents to the cord. The perception of vibration is often lost in tabes, but that loss is neither so constant nor so regular as to permit us to use this method as a true test of the presence or absence of muscular sense.

Before finishing the consideration of these tests I should like to mention one which I have devised for use in suitable cases. This test, which is a delicate one, is illustrated in the accompanying diagram. Let us take, in the first place, the results in a healthy person. A round black mark is made somewhere on the subject's left hand. The hand is laid on a table, and he is told to look at the mark. After 5 seconds he is made to close his eyes, and at the end of another period of 5 seconds, while his eyes are still closed, he is asked to touch the spot with a pencil held in the

right hand. The results of a series of such experiments are seen in the central of the three hands in the diagram. Thereafter the observer, having made a precisely similar mark on his own hand, replaces the subject's hand by his own. The experiment is then repeated. All the conditions remain the same except one, viz. that the hand which carries the black mark is not now the hand of the subject, and therefore all muscular-sense impressions are absent. The result is seen in the hand furthest to the left. In the first experiment the average error was 7·8 mm., in the second 20·5 mm. The difference represents the influence of the presence or absence of muscular sense. In the third of the three hands, that furthest to the right, is indicated the result of such an experiment in a case where there was slight left-sided hemi-ataxia.

It will be noticed that the carrying out of certain of these clinical tests and investigations involves the co-operation of consciousness on the part of the patient, while in others the test is automatic in action. The latter class includes (1) the knee-jerk; (2) the state of hypotonia; and (3) to a large extent Romberg's test. In the performance of the act of standing, complicated though its co-ordination is, the muscular-sense impressions are completely or almost completely unconscious. This takes the phenomena of Rombergism outside of the domain of cortical regulation (completely so, I think, if the patient does not know what is expected of him) and thereby renders the test a purer and more satisfactory one than it would otherwise be.

To contrast automatism with voluntary action, subconscious movements with conscious, would open up a field of inquiry of the most complicated and difficult kind, and its consideration must be deferred, at any rate until we shall have investigated the cerebellar functions. In the meanwhile it may be noted that actions, much more complex in their co-ordination than that of standing, may be performed without the aid of consciousness. For example, the hands may be untied during sleep though the knots which bind them are distinctly complex.

Before leaving the subject of the testing of muscular sense we may recall the fact, patent and evident to all of us, viz. that by means of practice the power and accuracy of the co-ordinating mechanism may be raised to a point much above that which is normal and usual. Indeed the dexterity which is thereby acquired is sometimes quite distinctly astonishing in its perform-

ances. I shall not be accused of overstating the case when I say that a conjurer, juggling with balls or plates, is to a normal man very much as a normal man is to an ataxic.

This remarkable dexterity which constant practice brings with it implies an increased fineness in the operation of the centres which receive and adjust the afferent impressions, perhaps also an increase in the delicacy of the peripheral receptors.

But there is more in the matter than this: for careful practice, be it muscular or be it mental, is only a carrying onwards of our education by the myelinisation of new tracts, the opening of new pathways by which stimuli may pass, the forming of new connecting links and associations for afferent and efferent impulses.

Even at the end of a long and full life there remain in the central nervous system many fibres which have never yet myelinated, many paths which have never yet been trod. It may be a comforting thought to some of us that after middle age, even at an advanced age, new myelinisation may take place and new tracts be opened up. This presupposes the presence of that activity of mind, that freshness of interest in what is new, which we all pray to possess up to the end, up to the very moment when we are summoned to pass within the Shades.

The influence of practice and exercise on medullation of nerve-fibre is very prettily shown by an experiment devised and carried out by Held. If a new-born animal be exposed to light, one eye being open while the other is kept closed, the fibres of the optic nerve on the lighted side myelinate much more quickly than do those on the other.

What has been said enables one to understand the rationale of Frenkel's method of treatment by re-education in tabetic cases.

TRACTS BY WHICH MUSCULAR SENSE TRAVELS UP THE SPINAL CORD.

When we come to consider these tracts, that is the bundles of fibres through which muscular-sense stimuli are conveyed towards the centres, to be there made use of in the process of co-ordination, we have to remember, in the first place, the reflex collateral which we have already studied. By these collaterals of the posterior root-fibres the nuclei in the anterior cornua receive their afferent stimuli. Nor may we regard these as peculiar to the spinal cord, for a similar arrangement must prevail in connection with the nuclei of motor-cranial nerves in the medulla

and brain-stem as far oralwards as the complicated cell systems of the 3rd nerve.

The neurones of muscular sense, of which these, with many others, are collaterals, arise, as has been already said, in the muscle-spindles and tendon-organs. They have their trophic centre in the cells of the spinal ganglia, and entering the cord in the posterior root, they divide dichotomously. The long ascending branch traverses the length of the cord in the posterior



FIG. 6.—PLATES OF MUSCULAR SENSE.

column—the column of Goll if the fibre in question come from the leg, the column of Burdach if it come from the arm. In any case the fibres remain on the ipsilateral side of the cord, no decussation taking place. Thus the tract reaches the upper end of the cord, and there the fibres of this long neurone terminate in a synapse, arborescing round cells in the nucleus of Goll or in that of Burdach, as the case may be.

It must not of course be supposed that all the fibres con-

tioned in the posterior columns subserve muscular sense. That some conduct the stimuli of bone vibration and that others are those conveying that cutaneous sense which we know as "space-sense"—the "*Raumsinn*" of German writers—has been clearly shown by the remarkable investigations of Head. This spacial quality of sensation, so carefully studied ten years ago by Henri, is usually investigated by means of Weber's compass test, and is physiologically—particularly in connection with stereognosis—a near ally of muscular sense. It is therefore natural that their paths should lie in close vicinity. Spacial sense is, however, outside the limits of our present subject.

Having reached the nuclei of Goll and Burdach, the stimuli of muscular sense in their further progress oralwards proceed by two altogether divergent paths. One of these sets of neurones goes by way of the mesial fillet (decussating) to the optic thalamus, where the fibres end in arborisations round cells in the medio-ventral nuclei of that complex structure. These cells send their axones to the cerebral cortex, chiefly to the post-central gyrus, where this part of the tract of muscular sense ends.

The other path leads from the nuclei of Goll and Burdach by the arcuate fibres, through the restiform body to the middle lobe of the cerebellum. We shall trace its course in more detail in the next lecture.

These two paths by which stimuli of muscular sense travel differ importantly in several points. The tract which leads by the fillet is almost completely crossed so that the impressions it conveys are received by the contralateral cortex. In striking contrast to this, the path by the restiform body to the cerebellum is chiefly uncrossed. Another difference, vital from the point of view of diagnosis, is that impressions conveyed by the fillet through the thalamus to the cerebral cortex lie above the limen of consciousness and are therefore capable of being perceived. Those, on the other hand, which pass to the cerebellum are subconscious and are not perceived. The only manner by which they could affect consciousness would be by utilising the cerebellum merely as a half-way house, and by passing through it and on to the pallium by tracts to be subsequently described.

Returning to the spinal cord there still remain for consideration two other tracts whereby muscular-sense impressions are undoubtedly conveyed upwards. The reflex collateral is not by any means the only collateral which the posterior root-fibres give off after they enter the cord. There are many others. Those

which concern us here are the collaterals which go to the cells of Clarke and of Stilling and arboresce round them

The dorsal spino-cerebellar tract (of Flechsig) commences in the cells of Clarke's column, beginning to appear as low as the third lumbar segment and increasing in size through the upper lumbar and lower dorsal regions. The Clarke's cells from which the tract springs have received arborisations from posterior root collaterals, usually from fibres which have entered the cord one or two segments lower down. Their axones are thus, so far as this line of transmission is concerned, the second neurone of muscular sense. These axones, large in size of fibre, pass at first horizontally outwards, and then, bending oralwards, run up the margin of the cord in the posterior part of the lateral column.



FIG. 7.—ORIGIN OF SPINO-CEREBELLAR TRACTS (AFTER CAJAL).

They leave the cord by the restiform body and so find their way to the cerebellum. The dorsal spino-cerebellar tract is almost entirely homolateral.

The ventral spino-cerebellar tract (Gowers) originates much in the same fashion, the axones which form it being, however, those of Stilling's cells and other small cells lying near the central canal of the cord. In this case also these cells are surrounded by arborisations of collaterals of the posterior root-fibres. The axones of these cells forming the fibres of the tract, run horizontally outwards and forwards to the periphery of the cord. They then turn oralwards and run up the cord, being placed ventrally to the tract of Flechsig. The mode of termination of these fibres in the cerebellum will be described later. The ventral spino-cerebellar tract, like the dorsal, is almost completely homolateral.

Thus, in their conduction up the spinal cord, the stimuli of muscular sense have three tracts by which they may travel:—

- (1) The long fibres of the posterior columns.
- (2) The dorsal spino-cerebellar tract (Flechsig).
- (3) The ventral spino-cerebellar tract (Gowers).

With regard to their ultimate destination, it has been seen that by the functional continuations of the posterior root-fibres in the fillet, the impressions of muscular sense gain the cerebral cortex. That appears to be the only path open to them whereby they can reach the sphere of consciousness, unless we are to suppose that

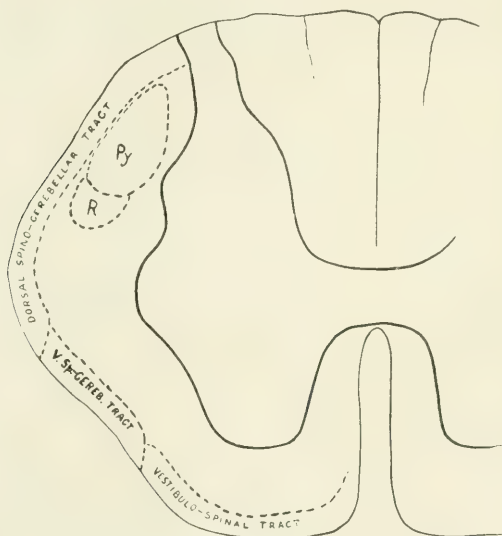


FIG. 9.—DIAGRAM OF TRACTS.

they do so by way of the cerebellum, an arrangement which does not seem at all likely.

On the other hand, at least three tracts conduct muscular-sense stimuli to the cerebellum—the long fibres of the posterior columns and their physiological continuation through the restiform body, and the two spino-cerebellar tracts which have just been described.

In this triplication of possible paths we may probably see the reason which underlies the clinical fact that disturbance of muscular sense is not so frequently produced by focal lesions of the cord as is disturbance of motility. No doubt we do meet with it at times, in such conditions as multiple sclerosis, syringo-

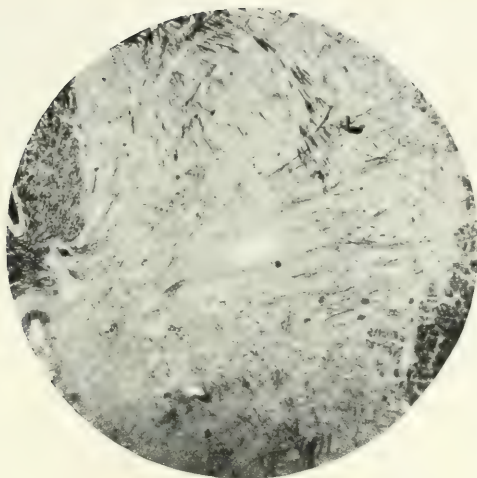


FIG. 8.—FETAL CORD (TRANSVERSE SECTION) SHOWING FIBRES GOING TO FORM SPINO-CEREBELLAR TRACT.

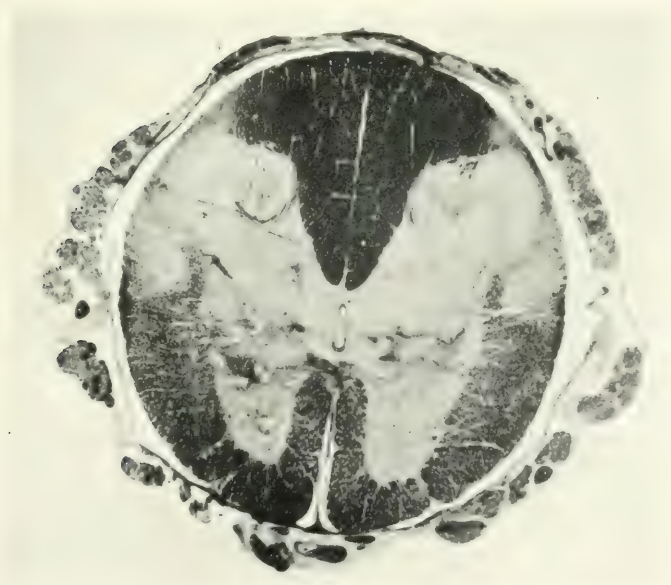


FIG. 10.—SECTION OF FETAL CORD, TO SHOW EARLY MYELINISATION OF TRACTS CONVEYING MUSCULAR-SENSE.

myelia, and the like, but the lesion must be widespread if such an effect is to be produced.

In sharp contrast to this stand matters as regards the peripheral neurone. Muscular-sense impressions, originating in muscle and tendon, are carried by one set of neurones only, those, that is, the fibres and collaterals of which form synaptical connections at the three points already mentioned, viz. (1) in the nuclei of Goll and Burdach, (2) at Clarke's cells, (3) at Stilling's cells. This peripheral neurone may be looked upon, so far as muscular sense is concerned, as *the initial common path*. Through it all such impulses must inevitably pass whichever of the three alternative courses they may choose to take afterwards. It is on that account that any degeneration of this peripheral neurone, this initial common path, such as we see in tabes and in some cases of alcoholic neuritis, is bound to intercept muscular-sense impressions and to produce ataxia.

Before leaving the consideration of the conduction of muscular sense in the spinal cord, it is worth while to note one other point, viz. the early myelinisation of these tracts, especially the posterior columns and the dorsal spino-cerebellar tract which receive their myelin sheaths as early as the 5th or 6th month of intra-uterine life. It is evident that the afferent apparatus designed for co-ordination is ready to undertake its duties at the time of birth and therefore long before the efferent motor fibres are in order. This applies to the human subject. In many animals the whole apparatus is capable of being used, is in fact used, at birth. A young chamois, for example, can stand and walk when born. Only a few hours later it can be seen to follow its mother, leaping from rock to rock with amazing precision.

TRAUMA AS A FACTOR IN DISEASE.

By ALEX. JAMES, M.D.

IV.

CAUSING apoplexy or stroke, and the paralysis which so often accompanies it, are three special brain lesions—cerebral hemorrhage, cerebral embolism, and thrombosis or softening, including toxic and encephalitic changes.

To distinguish clinically any one of these from the other two is not always an easy matter, so that each merits some detailed and careful study. Moreover, to enable us properly to understand instances of each, and to enable us to judge as to the part which can be played by trauma in bringing about one or other of them, some general consideration of the physics of the cranial cavity is important.

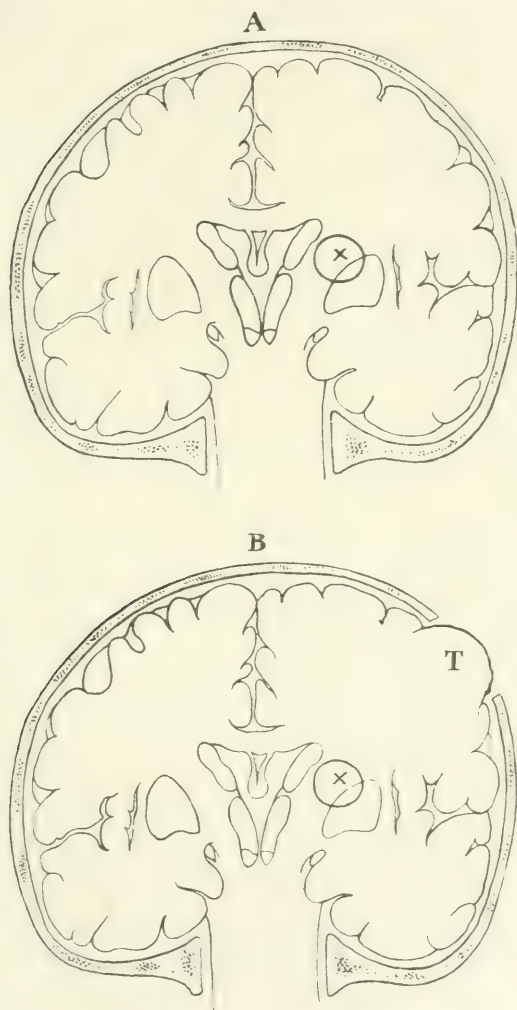
In the first place it is necessary to bear in mind that in nervous tissue as a whole, but especially in the tissue of the cord and brain, continued metabolism is an absolute necessity for vital action. Thus if we cut off the blood-supply to the brain, the result is sudden and complete unconsciousness; if we ligature the blood-vessels to the spinal cord, as complete and sudden paralysis and anesthesia; and if we in any such way interfere with the circulation in the medulla, the practical result is instant death.

But now, inasmuch as in all these tissues proper metabolism is so vitally important, it is essential that they all be safeguarded against jar or injury of any kind. Accordingly, in the brain, to which our attention has specially to be directed, we recognise this safeguarding to be brought about by—

1. The unyielding osseous case, which prevents any external pressure from tending to empty the capillaries.
2. The strong walls of the large venous sinuses, which prevent their contained blood pressing unduly on the brain substance.
3. The vertebral and carotid arteries in their course to the circle of Willis having to pass through bony canals, by which the brain is guarded against injurious over-distension of its arteries, as the result of increased cardiac action.

But now all these, and specially its unyielding osseous case, cause the brain to be under physical conditions different for the

most part from those pertaining in other organs of the body. The old simile of the brain in the cranial cavity and the beer in a beer barrel is well known. When the barrel is full we cannot put more in, and when we try to empty out the beer we can do so



only by letting air in. So is it with the contents of the cranial cavity. Brain substance and blood being practically incompressible, it will be evident that in that cavity increase in the amount of arterial blood must have associated with it diminution in the amount of venous blood or of cerebro-spinal fluid, increase

in the amount of venous blood must have correspondingly diminution in the amount of arterial or of cerebro-spinal fluid, and increase or diminution in the total amount of blood must have a corresponding diminution or increase in the amount of cerebro-spinal fluid.

But now suppose that at the circle *x* in the diagram A a rupture of a blood-vessel has occurred. It is evident that the blood extravasated, flowing as it will from a ruptured artery, must be at a pressure higher than that of the blood in the capillaries of the brain substance around. What happens, therefore, is, that in consequence of the unyielding osseous case this extravasated blood can make room for itself only by emptying the capillaries in the area of brain tissue around. In this way, therefore, a comparatively small effusion of blood can empty a very large capillary area and so can produce stoppage of function over a large area of brain.

But next suppose that, as represented in diagram B, a similar hæmorrhage has occurred at *x*, but that at T a trephine opening has been made. Through this the brain substance can now swell and bulge, and so it will be evident that the space occupied by the extravasated blood will be to a considerable extent allowed for. Thus capillaries, which in the unopened skull would be empty, will now be more or less normally full of blood. In this way we can understand that whilst symptoms of increased intracranial pressure produced by hæmorrhage, brain tumour, etc., can be more or less relieved by a trephine opening, we can also recognise how this relief of pressure might readily enough permit in the case of hæmorrhage of further bleeding, in the case of tumour of more rapid growth.

But another feature of importance in connection with the physics of the brain is that, again in consequence of its unyielding osseous case, the process of healing after destruction of brain substance presents peculiarities. Suppose, for example, that a portion of brain tissue has been destroyed by softening, hæmorrhage, encephalitis, etc., the healing process, instead of leaving a cicatrix, as it does in other tissues, is very apt to leave a cyst. How is this? It is simply the result of the fact that whilst in other tissues reabsorption of the destroyed tissue is allowed for by the surrounding parts falling in to fill up the space, this in the brain cannot so readily occur. In this way the brain and the lung present a close physical resemblance, for just as loss of tissue in the brain tends to be followed by the formation of a cyst, so loss

of tissue in the lung tends to be followed by the formation of a cavity.

But the comparison as regards physical conditions between brain and lung can be carried further. Thus in the lung, when as the result of loss of tissue a cavity is formed, and when in the walls of that cavity an artery is laid bare, there tends to be formed in that artery a little dilatation, a miliary aneurysm. This aneurysm is, as is well known, ascribed to want of support at the part, and this is to a large extent true, but it is no less true that a factor which aids importantly in its formation is the negative pressure which pertains in the cavity itself. Owing to the but little yielding of the thoracic walls, and owing to the out-dragging tendency of the fibroid tissue around, this negative pressure will always, except during coughing, be acting. It will be increased with each inspiration, and still more increased when, as the result of bronchial catarrh, there is any obstruction in the tube or tubes which lead to it.

Now a somewhat similar physical condition exists in the brain when as the result of advancing age the trophic power of the cerebral tissue is failing. The senile "lean and slippered pantaloon" presents "shrunk shanks" as evidence of his progressive loss of trophic power, but his bony skull cannot shrink, and so the lessened trophic power and diminishing bulk of his brain must be allowed for in other ways. A larger proportionate amount of blood, a larger quantity of cerebro-spinal fluid, with dilated ventricles (senile hydrocephalus) and progressive thickening of the membranes will all tend to help in this process. But the formation of miliary aneurysms must, I think, be also regarded as a consequence.

We can further understand how, as the result of this tendency to negative pressure in the cranial cavity with advancing years, a vicious circle becomes established. One hæmorrhage having occurred, the reabsorption and cicatricial encapsulation of the blood and destroyed cerebral tissue must so act as to still further increase this negative intracranial pressure, and so favour dilatation and rupture of vessels around. Each hæmorrhage, therefore, must materially increase the liability to a subsequent one.

Lastly, what for our purpose is very important will now be evident. This is that in consequence of these peculiar physical conditions existing in the cranium, anything in the way of trauma or shock which in any way tends to impair the trophic power of brain tissue must indubitably be a possible factor in expediting

the onset of those mechanical processes which lead to hæmorrhage and other senile changes.

Cerebral Hæmorrhage.—Cerebral hæmorrhage as the result of trauma or disease may occur at any part of the brain, but when it is the result of disease alone, it is most common in one of the branches of the left middle cerebral artery, at or about the region of the internal capsule. The special frequency for the burst to occur there is believed to be due to the physical fact that it is there that the weakening of the arterial wall, relative to the pressure of the contained blood, reaches its acme, and that it is there or thereabout also that the wear and tear of life, with its strains and toxins autogenous and exogenous, tends to produce in maximum degree its devitalising effects on brain tissue in the average right-handed man.

Being caused by a burst, cerebral hæmorrhage is most likely to occur when the individual is active and at work, or is being exposed to physical or mental strain, excitement, or shock.

Its symptoms vary practically indefinitely in different cases, according to the quantity of blood escaping and according to the locality of the escape. In an ordinary moderately severe case they are mainly loss of consciousness, as if the individual had been felled by a blow ($\alpha\pi\sigma\ \pi\lambda\eta\gamma\eta$), and more or less well-marked hemiplegia.

Cerebral Embolism.—In cerebral embolism the stoppage of brain metabolism, with its suddenly disturbing effect on consciousness, muscular power, etc., may occur on either side of the brain, but owing to the left common carotid arising from the highest point of the aortic arch, and owing to the left middle cerebral artery being its largest continuous branch, the part of the brain most frequently implicated is in a way the same as in cerebral hæmorrhage. Obviously, however, the symptoms of embolism must be all over much milder. Apart from the fact that in embolism there is no tearing up of brain substance, as in hæmorrhage, the embolism itself being often small, the artery which it blocks and the capillary area thus deprived of blood will be small correspondingly. Accordingly in embolism a hemiplegia alone, that is to say without loss of consciousness, or an aphasia alone, is quite common, and the occurrence of such conditions in a young subject affected with mitral or aortic valvular disease makes the recognition of cerebral embolism often a comparatively easy task. As regards the influence of activity in bringing about cerebral embolism, in my own experience most instances of it have

occurred when the patients were in bed suffering from the endocarditis which had caused the embolism. I have seen several instances of ruptured cusps or cordæ tendineæ from muscular exertion, but I have never seen any in which I could believe that the ruptures had caused embolism.

Cerebral Thrombosis or Softening, including Toxic and Encephalitic Changes.—In cerebral thrombosis the stoppage of metabolism is generally believed to be brought about by clotting and consequent capillary block at some part of the brain substance, and although as in hæmorrhage and in embolism this part is frequently the part supplied by the branches of the middle cerebral artery, it is yet, more frequently than in hæmorrhage and embolism, elsewhere. Occurring in the elderly and in the old, this clotting is the result of two main mechanical factors—(1) a diseased condition of the artery walls; and (2) a slow and feeble blood-stream. Bearing these factors in mind, we can understand how the symptoms of cerebral thrombosis, although similar in nature to those of hæmorrhage, yet present to them distinct points of contrast.

Thus, whilst cerebral hæmorrhage is prone to occur at or about the central portions of the brain, where the arteries are large, the blood-pressure is high, and the blood-stream is rapid, cerebral thrombosis is more apt to occur at or about the peripheral or cortical parts of the brain, where the arteries are small, the blood-pressure low, and the blood-stream slow.

Next, occurring in this way more frequently about the cortical parts, the symptoms induced are apt to be at once less definite and more restricted. If, for example, branches of the anterior cerebral artery are involved, all that may be noticed may be some headache or giddiness, with perhaps some fever, followed by ill-defined dulness of intellect only. If those of the posterior cerebral are involved, a sudden onset of hemianæsthesia, or feelings of prickling or tingling in the extremities, or the occurrence of hemianopsia may be the result. On the other hand, if it is the branches of the middle cerebral which are involved, a monoplegia rather than a hemiplegia is apt to occur. Moreover, because in thrombosis the lesion often involves a cortical centre, irritative and spastic symptoms are apt to become associated with the paralytic when these motor parts of the brain are affected.

Next, for obvious reasons, whilst a hæmorrhage is apt to occur during activity or under conditions of strain or excitement, a thrombosis is apt to occur during rest and quiet. Its supervention during sleep is not uncommon, the patient feeling nothing

wrong until on waking in the morning he tries to get up and finds a paralysed limb.

But now conditions of cerebral thrombosis, or, to be accurate, conditions presenting symptoms similar in nature to those of cerebral thrombosis, often present themselves in middle and early life. Apart from syphilis, in which its occurrence is generally ascribed to narrowed arterial lumen, conditions of this kind occur not infrequently in young subjects and indeed at all ages, associated with health impairment of very varied kinds, and with fevers and infective diseases, debility, chlorosis, leukaemia, tubercle, Bright's disease, etc. In many such cases the blood-vessels are healthy, and to some increased coagulability of the blood the thrombosis has been ascribed. I have always been of opinion that a better explanation is that the symptoms in such cases are due to some toxic or infective agency acting primarily on the nervous tissue, and secondarily only on the blood-stream, in a way somewhat analogous to that which brings about a polioencephalitis or a poliomyelitis.

Looked at in this way we can believe that between the transient or temporary and the progressive or permanent hemi- or mono-plegias, hemi- or mono-anæsthesias, hemianopsias, aphasias, etc., the difference is mainly one of difference as regards the virulence and continuance of action of the toxic or infective product. In the transient forms we can imagine that the toxin produces only a temporary paralysing effect, whilst that in the permanent its action has been sufficiently powerful or continued to induce permanent degenerative or inflammatory changes.

And now, after this general consideration of the physical conditions existing in the cranial cavity and of the pathological processes, one or other of which can induce apoplexy or stroke, some general ideas as regards the influence of trauma, shock, or strain in inducing or tending to induce morbid changes there may be formed.

In this connection we can understand that any shock or strain may so lower the trophic power of the brain as to render it more prone than it otherwise would have been to hæmorrhage or to softening. We all know that brain concussion may be followed days or weeks or indeed after longer periods by hæmorrhage, either into the substance of the brain or on to its surface. Oppenheimer has stated that in such cases the hæmorrhage is usually preceded by local tissue softening, the so-called traumatic late apoplexy, and with the view that the late effects of concussion are more

likely to be softening than hæmorrhage, my study of the subject disposes me to agree. There can be no doubt, however, that the lowered trophic power of brain tissue, whether inducing patches of softening or not, must also tend, and especially in those in whom the heart is sound and the blood-pressure high, to favour the development of miliary aneurysms, which are the precursors of hæmorrhage.

Oppenheimer also refers to the occurrence of softening and of multiple thrombosis in the brain after carbonic-oxide poisoning and after extensive cutaneous burns, in both of which traumas, as we can readily understand, the brain tissue and nerve tissue generally must have been subjected to conditions which powerfully lessen nutritive power. Oppenheimer further gives it as his experience that diseases of the nervous system, which are associated with continued disturbance in the function of the innervation of the heart and vasomotor system, such as cardiac neuræsthenia and certain forms of traumatic neurosis, may be the exciting cause of atheroma and the brain changes associated with it at comparatively early periods of life.

Those of us who have years and experience will agree with this. It must be remembered that in the self-tormenting, and it must be said often also the doctor-tormenting, neurotic and hypochondriac there must be some toxæmia, relative or actual, which, making itself felt subjectively by chronic feelings of unwellness, makes itself recognised in time objectively by arterial sclerosis. But one is forced in this connection to put forward again the proposition that in certain of these traumatic cases the late organic brain trouble which ensues may be less the result of the trauma than of the months and years of self-concentration and introspection which in these days are so prone to follow it. *L'appetit vient en mangeant*, and though it may not be correct French, *la maladie vient en traitant* is very near the truth.

Next as regards the occurrence of hæmorrhage or of thrombosis or softening as the direct result of strain. It has already been pointed out that conditions of activity or strain which tend to increase blood-pressure and blood-flow must favour hæmorrhage, and also that these same conditions must have a contrary effect as regards thrombosis and softening, tending as these do to occur when the blood-pressure is low and the circulation is slow. In cases of apoplexy or stroke, therefore, due or alleged to be due directly to trauma or strain, it is of great importance to diagnose whether the lesion has been a hæmorrhage or a softening.

Here be it noted that it is not for a moment to be concluded that cerebral hæmorrhage cannot occur when a patient is physically and mentally at rest, or that a cerebral softening cannot occur when a patient is undergoing physical or mental strain. All that is to be inferred is that these two pathological processes are apt to be influenced contrarily by rest and strain. Moreover, one must not lose sight of the possibility that a hæmorrhage may follow on the structural changes induced by a patch of softening or encephalitis. Especially I believe is this to be contemplated in the cerebral hæmorrhages of children and young persons.

Of 100 cases of apoplexy treated in the Royal Infirmary 8 gave history of trauma, which might be regarded as having had some influence on the disease. The interesting feature is that in every one of the 8 the condition was believed to be either a softening or an encephalitis.

1. David M., aged 46, a machinist, was admitted 12th March 1895 complaining of pain in the head and weakness in the legs and right arm, dating from an accident eleven months before. Family history was good. His surroundings at home and at work were satisfactory. He had had no serious illnesses at all, and he gave no history of alcoholic excess.

Accidents.—He has had several accidents to his hands. At one time two of the fingers of his left hand had to be amputated, along with the first phalanx of a third; at another time two of the phalanges of the forefinger of his right hand. These, however, have given him no trouble. His serious accident had occurred on the 10th of April 1894, that is to say, eleven months before.

Whilst at work an iron block, weighing some ten or eleven pounds, fell from a height, striking him on the left side of the head immediately above the left parietal eminence. He was thus precipitated into a pit five feet deep, where he landed on his back on an iron bar. He was unconscious for some twenty minutes and was carried to hospital, where the wound on the scalp was stitched and dressed. By the time this was done he had regained consciousness, and he was sent in a cab home to bed. He kept in bed, and was feeling fairly well after a few days, sitting up for a few minutes each morning to get his head dressed. On the night of the eighth day after the accident, however, he was not so well. He was feverish and uncomfortable, and suffered from pain in his head. Next morning, when the doctor came, on attempting as usual to sit up to get his head dressed he found that he had

completely lost the power in both legs. He also had some loss of power in the arms, specially the right arm. A few days afterwards he tells us that the doctor noticed impairment of sensation in both legs as well. Before this, however, he had been noticing numbness and tingling in both legs, and also some jerkings in the legs, specially when he was going off to sleep. This condition continued, and about a month after his accident he experienced also some loss of bladder control. In this condition he seems to have continued, lying in bed practically helpless, till about the end of the seventh month. About the eighth month some improvement began to show itself, first the arms and then the legs recovering a certain amount of motor power. By the end of the eighth month bladder control had returned, and he began with the assistance of his wife, and then of two sticks, to move about the house. Nine months after the accident, whilst standing washing himself, he experienced a sudden severe and sharp pain in the head. He lost consciousness and fell to the ground. The loss of consciousness was only momentary, but all that and the succeeding day he remained stupid and suffered severe pain in the head.

Since that date he has had four other attacks of a similar nature. In them he has never again completely lost consciousness, and being prepared for them he has not fallen. At intervals also he has had severe headaches, sometimes lasting for twenty-four hours. When the headache is severe he also feels a peculiar hissing sound in the head, and he indicates the site of injury as the place where this hissing sound is heard.

On examination there was marked impairment of voluntary motor power in both legs, but specially in the right, and to a certain extent also in the arms, specially the right. There was increased knee and ankle jerks in both legs, specially the right, with both ankle and knee clonus. In the right arm, the biceps, supinator, and triceps jerks were also increased. Although at times he had complained of numbness and tingling in the limbs there was no impairment of sensation on his admission. As regards sight, the pupils reacted somewhat feebly both to light and accommodation. There was no nystagmus, and ophthalmoscopic examination revealed nothing abnormal.

During his stay in the wards he improved very considerably. The headaches gradually left him, he began to walk about, and his voluntary motor power gradually improved. The weakness in both legs, but more markedly in the right, and in the right arm

persisted, however, along with increased knee and ankle jerks and clonus, and in the arm some increase in the elbow and wrist reflexes.

In this case there was much in the symptoms that suggested a pachymeningitis hæmorrhagica, but we were of opinion that the pathological process was rather one of acute softening affecting the leg and arm area on the left side of his brain, and to a slighter extent the leg area also on the right side. This had been followed by irritative and fibrotic changes indicated by the subsequent congestive attacks. We considered that the accident was the actual cause of his condition. It had been a very severe one, and had acted by lowering the trophic power of the brain tissue, especially at those parts.

2. William M., aged 24, a mason's labourer, was admitted 28th May 1901, affected with paralysis of the left arm and left leg. His family history appeared good. His surroundings at home and at work were favourable. He had had no serious illnesses, but he acknowledged alcoholic excess for years, and specific disease four or five years ago.

About fifteen months ago, when he was walking home for breakfast one day, he suddenly lost some power in his left leg and arm, and to a certain extent he says in the right (?) side of his face. After a month's treatment at home he completely recovered from this.

His accident occurred four months ago. One night when he was drunk he was going upstairs and fell, his head striking the wall. He became unconscious and remained so for three days. When he recovered he found himself at home, where he had been carried by some of his neighbours. A doctor was sent for, who, finding paralysis of left arm, leg, and face, advised his removal to a hospital. In hospital the paralysis of the left side had been recognised, and the advisability of operation for blood effusion on the brain, the result of the fall, had been contemplated. This, however, was not done, and he gradually improved, the face paralysis rapidly disappearing. He was discharged from hospital after three weeks, but as the paralysis of the left arm and leg have been persistent, he sought admission to the Infirmary to see if anything more could be done.

On examination we found him to present the usual appearances of a left hemiplegia due to specific lesion—paralysis, rigidity, increased reflexes, and clonus, etc.

In this case we believed that the injury had simply lighted up the specific trouble at the part of the brain most predisposed to its effects. We understood that the reason why operative interference had been decided against immediately after his accident was owing to the discovery that the part of the head injured and the parts found paralysed did not tally.

3. Robert M., aged 57, a miner, was admitted 14th May 1900, affected with left hemiplegia. His family history was unknown. He had always been healthy and temperate; he had been a fisherman for 35 years; for the last 10 he has been a miner.

Accidents.—Nine years ago he had two ribs fractured. Eleven months ago he had a stroke under the left eye from a rod of iron, from which he soon got well, and did not think any more about it at the time. About a month after this accident, when sitting quietly and reading one forenoon, he noticed when he rose that he could not see. Two days after this, when he was getting out of bed, he fell down unconscious. When he recovered he noticed that his left arm and left leg were quite powerless and that his left eye was blind. Three days after this he had another fit of unconsciousness, and he tells us that in the eleven months which have elapsed since then he has had other four.

On examination we found impaired voluntary motor power in the left arm and leg. With increased knee and ankle jerks in both legs, but especially in the left, there was also in the left arm increased elbow and wrist jerks. Both left arm and leg showed rigidity. Sensation was unimpaired anywhere.

As he was complaining of impaired vision in the left eye, he was sent to the eye department, and the following was the report:—“Nothing of importance in the fundus. There is a small amount of myopia, but he gets full vision (distance) with his right eye and $\frac{6}{18}$ ths with his left eye.”

In this case we believed that the condition was one of softening on the right half of the brain, and that what he had called blindness of the left eye had really been a left hemianopsia. We believed that had it been looked for at the time some hemianæsthesia would have been discovered. We considered that the accident to his cheek under the left eye had had practically no influence on his condition, that is to say that his disease was entirely the result of senile and other changes.

4. William B., aged 16, a miner, was admitted 11th August

1898, affected with right cortical hemiplegia. Family history was fairly good. As regards previous illnesses, he had had measles when a child, and pneumonia at the age of ten. He was a well-grown lad, looking older than his years. He was teetotal.

Accidents.—Eighteen months ago his right arm, from the elbow downwards, was crushed between two hatches, and he says that though he was able to work all right, it was never so strong as it was before. Nine months ago, one day when at work, he felt chilled and shivered, so that he had to leave his work and go home. When he got home he felt stupid and dazed. He kept off work for about ten days, and when he began to move about he noticed that the right leg, right arm, and right side of the face seemed to have lost power. This loss of power in the right arm and leg had continued, so that now he was unfit for work.

On examination nine months after this illness and eighteen months after the accident we found impaired voluntary motor power in right arm and leg. The knee and ankle jerks and ankle clonus were present in both legs, but much more so in the right. In the right arm the elbow and wrist jerks were well marked. Sensation was nowhere affected.

In this case we believed that the condition was simply an acute or subacute infective or toxic polioencephalitis. The fact that his right arm had been crushed nine months before his illness, taken along with the fact that the part of brain specially implicated involved the motor area corresponding, was only what one should expect. If this lad had suffered from a neuritis, *e.g.* diabetic or tubercular, instead of from a polioencephalitis, the right arm would probably have been the part mostly affected.

5. Charles M., aged 58, a miner, was admitted 17th February 1900 complaining of loss of power in the left hand and foot, with feelings of coldness in those parts. His family history was apparently good. He gave a history of some kidney trouble eight years ago, and he acknowledged alcoholic excess. He was a fairly well-grown and developed man.

Accident.—Seven weeks ago, when working in the pit, a large stone and some earth fell from the roof, striking him on the back of the neck. This, he said, knocked him down and stunned him. At the same time his left leg got caught in the slip of earth, and he says he lay for an hour with his leg jammed before assistance came. He was never quite unconscious, he had no bones broken, and he was able to walk home when released.

Immediately afterwards he complained of feelings of coldness in the left hand, and of pins and needles there, also of exactly the same sensations in the left foot. He said, too, that he spat up blood for two days after the accident. Those sensations in the left arm and foot and the weakness in those parts prevent him being able to work.

On examination we found absolutely no objective signs of disease, but the man was 58 years of age and was really older than his age, so that when he said he was unable to work we could not contradict him. We contemplated the possibility of there being some small patch of softening involving the sensory tracts at or about the posterior part of the internal capsule on the right side of his brain, and we recognised that the accident might have influenced this, but we considered that senile change formed the important factor in his condition.

6. Robert C., aged 37, a labourer, was admitted 3rd September 1896 complaining of weakness of the right arm and leg of some fifteen months' duration. His family history appeared good, his home and work surroundings satisfactory, he had had no previous illnesses, and he declared himself to be teetotal.

Accident.—Some three years ago his right middle finger was crushed, necessitating its amputation. He did not ascribe to it any part in his present illness, which he said began about fifteen months ago, by his observing that his right arm and right leg seemed to be weaker than they were before. He told us that his attention was drawn to this by the observation that he could not lift the usual weights with his right arm, and that he seemed in walking to be unable to lift his right leg clear of the ground. For this he was admitted to hospital in Douglas, Isle of Man, and there he was kept about eight months, not, however, improving during that time. On his discharge from hospital he again tried work, but found he was as bad as ever, and he frequently also felt so giddy that he fell to the ground as if he was drunk. These giddy turns, he said, had occurred before his hemiplegia, that is to say, some three or four years ago, but he tells us that they were worse some time after he noticed his muscular weakness.

On admission we found little in the way of sensory disturbance, but distinct increase in the deep reflexes of both legs, specially the right, with ankle and knee clonus. In the right arm the elbow and wrist jerks were distinctly increased. His other organs were normal, except for some slight thickening of his arteries.

This man did not give a very lucid account of himself and of his symptoms, but we believed that, as in the previous case (5), there had been a softening or polioencephalitic process which had specially implicated the motor parts of the brain corresponding as regards side to the finger injured some twenty months before.

7. William G., aged 64, formerly a railway guard, was admitted 5th February 1897 complaining of great general weakness and special weakness of the left arm and leg.

History.—His family history was good. His work on the railway had been of an anxious kind. He had had practically no previous illnesses, and he had been careful as regards alcohol.

Accident.—Nine years ago he was in a serious railway accident, his train running into another one. He was flung across his van, cutting his head on the brake wheel. Still he says he was able to run along the line for some miles with a lamp to warn approaching trains. Six years ago he had to leave his work owing to rheumatic pains in limbs and back. Since he has given up work those pains have disappeared, but he has been feeling progressive weakness. Four years ago he lost his speech suddenly, but after some months it gradually returned. Five months ago he was found lying on the floor in his room. His son told us that at the time he was quite unconscious and cyanotic. From this he gradually recovered, but he was distinctly weaker after than he had been before. Two months ago one morning his relatives informed us that he had suddenly gone off his head, and it was noticed that his speech was slurring and mumbling. Although he was better next day and able to sit up, he was advised to come to the Infirmary as soon as possible.

On admission we found great general weakness, with evidence of left hemiplegia. He had great difficulty in walking, showing some want of co-ordination. He had also incontinence of urine. Mentally he had also failed, and his speech was slow, laboured, and stuttering. He had no albuminuria, and his heart and other organs were fairly normal for his age.

In this case we believed there had been patches of brain softening, the result of premature senile changes. The accident and the strain associated with it had been severe, so that we regarded these as having played a part in inducing this premature senility.

8. Henry L., aged 63, a shoemaker, was admitted 6th Janu-

any 1899, affected with paralysis of the right arm, leg, and face. His family history was good. He had been fairly temperate, and comfortable at home and at work. He had had practically no previous diseases.

His accident occurred on the 27th December previously. He fell, and seems to have broken a rib. This did not, however, confine him to the house, for four days afterwards (31st December) he was walking on the street when he felt giddy and felt his legs giving way under him. He also could not speak, but with the assistance of two men he was able to walk to his doctor's house. The doctor bandaged his chest, and, telling him that he had had a slight stroke, advised him to go home to bed. Although feeling rather shaky, he was able to do this quite well.

He lay in bed at home, and on the 5th January following (*i.e.* the day before his admission) he had another shock he believes, for when he awoke in the morning he felt pain all over his right side and felt his right arm and right leg powerless. He accordingly was brought to the Infirmary.

On examination there was found the usual impairment of voluntary motor power in the right arm and leg, with increased deep reflexes and slight impairment of skin sensibility. At first there had been also some speech thickening and paralysis of the right side of the face, but these had rapidly cleared off.

The diagnosis was softening as the result of senile changes, but possibly slightly aggravated by the injury to the chest.

As will be observed, in all these eight cases quoted the diagnosis was softening or encephalitis. In not one was it hæmorrhage or embolism.

When one thinks of the pathological process in cerebral hæmorrhage, and of the part which concussion or strain might be regarded as playing in its production, this certainly seems somewhat remarkable. Yet it is the case that although out of the hundred cases of apoplexy investigated, there were forty in which the condition was believed or known to have been caused by cerebral hæmorrhage, in not one of these had trauma been adduced.

In this connection, however, there is a possibility that must not be overlooked. This is, that as hæmorrhage sufficiently severe to necessitate a man's admission to hospital is much more likely than softening to be followed by fatal results, so in hæmorrhage induced by strain or trauma the fact of the existence of the strain

or trauma is less likely to be made known. I cannot better illustrate this than by the following case of cerebral hæmorrhage, which was under my care in the Infirmary some years ago:—

Robert S., aged 49, a lorry driver, was at work at his lorry as usual on the morning of 5th March 1903, when he suddenly appeared dazed, mumbled some words, and fell to the ground on his left side. He was at once assisted by the police into a cab and brought to my ward in the Infirmary.

On admission he could give no account of himself, but it was ascertained that he had always been a strong healthy man, accustomed to hard physical work, and moderately alcoholic.

On examination a left-sided hemiplegia was recognised, the face, tongue, arm, and leg all being involved. The head was turned to the right, with conjugate deviation of the eyes to that side. He was practically unconscious, deglutition could be performed, but although there was no over-distension of the bladder, the urine kept dribbling. His temperature was normal, his pulse 88 per minute, arteries hard and tortuous. His heart was enlarged, and there was slight albuminuria.

In this practically unconscious state he remained all the day of his admission, and also the day following (6th March). On the night of the 6th he was very restless; his temperature rose to 100, his pulse fell to 60. At 10 A.M. on the 7th he suddenly developed coma, with markedly stertorous breathing, and at 10:30 he became convulsed, passing into a state resembling orthotonus. A few minutes later he died.

At the sectio it was found that the burst had occurred from a miliary aneurysm about the caudate nucleus on the right side, that it had torn up the internal capsule and escaped into the right lateral ventricle and then into the left, and into the 3rd and 4th ventricles. The kidneys were cirrhotic, the heart enlarged, and the vessels at the base of the brain dilated, tortuous, and atheromatous.

In this case, as can be understood, we got no history of the onset of the condition from the man himself. On inquiry, however, we found that although he had been working as a healthy man up to the moment of his stroke, yet that he had had two similar but slighter attacks, both of which, like his last, had occurred when he was at his ordinary heavy lifting work. The first had been two years and the second six months before.

A perusal of this case will show that it would have been as

easy to adduce strain as having been the exciting cause in all of these seizures as it would have been impossible to deny its agency. Yet the truth in such a case is that each straining effort must simply be regarded—*qua* the seizure—as having been as it were the last fragment of the last straw to a back continuously yielding and momentarily approaching nearer and nearer the breaking point as the result of its own intrinsic weakness.

But a point of considerable medical interest in this man's case is as to whether in his two previous attacks the pathological occurrence was really one of slight hæmorrhage. In cases of slight "stroke" like this, which are rapidly recovered from, it is often impossible, even on post-mortem examination, to make sure of this. Personally, I am one of those who incline to the view that their real cause is often some toxic condition. As already mentioned, Oppenheimer gives it as his opinion that in traumatic late apoplexy due to hæmorrhage a softening may precede the hæmorrhage. I believe that the same may be said of ordinary apoplexies as well. Moreover, for the slight and often transient cerebral attacks, which by days, weeks, months, or years may precede a cerebral hæmorrhage, I am of opinion that some toxæmic condition must often be held accountable.

AN EXPERIENCE OF THREE CASES OF PUBIOTOMY.

By J. LAMOND LACKIE, M.D., F.R.C.P.,

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DURING his last quarter on duty, commencing on 1st January this year, Dr. Haultain very kindly gave me permission to select suitable cases for pubiotomy and to do the operation, and for this privilege I am deeply indebted to him. During the quarter five cases were seen which raised the question of the operation, but in two of the cases a necessary condition was absent, which resulted in other means being adopted. In one, forceps had been used by two doctors outside without success. On admission the case seemed suitable for pubiotomy, but the foetal heart could not be heard, although it had been audible a short time before when the patient left her home. Craniotomy was therefore performed. The other patient was unmarried and a *ii.-para*. Her first child

had been born after craniotomy, and forceps on this, the second, occasion proved of no avail. The pelvic brim was only slightly contracted, and the case was most suitable for pubiotomy, but the patient refused to have the operation, and one was therefore again compelled to do craniotomy.

Three cases fulfilled all the necessary conditions, and they differ from the case recently recorded by Dr. Young,* in that the chief indication was a contraction of the brim, not of the outlet. They were:—

CASE I.—Mrs. C., *æt.* 35, was sent to the Maternity Hospital by Dr. Beatty of Pitlochry on 6th January 1912. She had been married for seven years, and was pregnant for the fifth time. Her obstetric history was as follows:—(1) A full-time girl, transverse presentation, born dead after embryulcia; (2) a full-time boy delivered by forceps, still alive; (3) a full-time girl, a transverse presentation, now four years old—patient says forceps were used; (4) two years ago a full-time male child, a transverse presentation, born dead after embryulcia. She had had no miscarriages.

State on Admission.—Patient was of small stature. On examination of the abdomen the head was found lying above and to the left of the umbilicus, the fetal limbs were in the right iliac fossa, but the position of the child could be altered very easily as there was abundant liquor amnii. The pelvic measurements were—interspinous, $9\frac{1}{2}$ ins.; intercrystal, 10 ins.; external conjugate, $7\frac{1}{4}$ ins.; diagonal conjugate, $3\frac{3}{4}$ ins.; the conjugate area was therefore $3\frac{1}{4}$ ins.

On Friday, 19th January, the patient went into labour shortly before midnight. The first stage was slow, and it was not till 5 P.M. on Saturday the 20th that the os was nearly fully dilated and the membranes bulged in a sausage-shaped form into the vagina. These were ruptured artificially, and strong labour pains supervened. The head did not, however, descend, but remained above the brim. A quarter of a grain of morphia and $\frac{1}{200}$ th grain of scopolamine were administered hypodermically at 6 P.M., but the contractions continued strong and forcible. At 6.30 I decided to perform pubiotomy, and this was carried out in the usual way. Forceps were not in this case tried at all before the operation, because it seemed evident that the disproportion between the head and the pelvis was sufficiently great to prevent safe delivery by forceps without a preliminary enlargement of the pelvic girdle.

* *Edinburgh Medical Journal*, May 1912.

A vertical incision, one inch long, was made a finger's breadth to the left of the pubic spine. Through the incision a finger was inserted and the bladder pushed to one side. Döderlein's needle was passed through the wound, over and then behind the pubis, and down till its point was felt through the soft tissues below the pubic arch. The house surgeon, Dr. Sivright, having drawn the left labium to the right, made a small incision over the point, so that it came through, and he then attached to it the end of Gigli's saw. The needle was now withdrawn, so that the saw came through the upper wound. The handles having been attached, the bone was sawn through. The raw edges did not spring apart, but in case this should happen, pressure was applied at first to prevent it. The patient was put in Walcher's position, forceps were applied, and the child was delivered most easily and with scarcely any traction at all. The upper wound was closed by sutures, the lower was packed. The whole operation and delivery lasted exactly 17 minutes.

Broad strips of plaster were applied round and round the pelvis several times and the patient was put back to bed. She was turned on her side from time to time during the first three days, and on the 4th day she turned herself. She sat up on the 14th day, and was allowed on a chair on the 15th. She took a few steps on the 16th day, and walked to the fireside on the 17th.

Unfortunately on the 22nd day the patient developed a moderate phlebitis in the left calf, which detained her in hospital for three weeks longer, but at the end of that time she was well and able to walk without a limp or any pain. Dr. Beatty writes me to-day that Mrs. C. is absolutely well in every respect. The child, which did well, weighed 6 lbs. 2 ozs., and was $20\frac{1}{2}$ ins. long, but though it was not quite up to the standard in weight, the measurements of the head were normal. They were—sub-occipito-bregmatic, $4\frac{1}{2}$ ins.; occipito-frontal, $4\frac{1}{2}$ ins.; occipito-mental, $5\frac{1}{4}$ ins.; cervico-bregmatic, $3\frac{3}{4}$ ins.; fronto-mental, $3\frac{1}{4}$ ins. This case, then, proved eminently satisfactory for mother and child up to the time of the phlebitis, which might have occurred after a normal labour, and which has never been suggested as one of the special complications of the puerperium after pubiotomy. It is held by some that for a pubiotomy to be perfectly successful spontaneous labour must take place after the operation. I can see no reason for this, and indeed it must be absolutely necessary to use forceps in many cases. It was so in Cases II. and III.

CASE II.—Mrs. C. W., æt. 27, was admitted to the Maternity Hospital on 22nd January 1912. She had been married for five years and had had 3 children—(1) a boy at the 7th month, born dead: (2) a boy at the 8th month, delivered by forceps, dead: (3) a boy at full time, delivered by forceps, alive.

State on Admission.—Patient was a healthy-looking woman but of small stature. She was about eight months pregnant. The pelvic measurements were — interspinous, 10 ins.; intercrystal, $10\frac{1}{4}$ ins.; external conjugate, 7 ins.; diagonal conjugate, $3\frac{3}{4}$ ins.; true conjugate, $3\frac{1}{4}$ ins. Labour started on Saturday, 17th February, at 10 A.M. At 1.30 A.M. on the 18th the os was fully dilated, and the membranes were ruptured artificially. It was noted that the child was in the R.O.P. position. After waiting an hour and observing that no progress was made, high forceps were applied, but the most vigorous traction on my part or on the part of Dr. Sivright made not the slightest impression on the descent of the head. Pubiotomy was therefore performed in the usual way, and, then the patient was placed in Walcher's position and the forceps reapplied. Here I made a serious omission. Forgetting for the moment that the head was in the R.O.P. position, I did not rectify this, but applied traction and dragged the head into the brim, where it remained fixed, and it was then impossible to rotate the fetus to a more favourable position. However, I thought it would not matter much, since the pubis was severed, but this proved erroneous, for after all I was dealing, even after the operation, with a pelvis whose brim had become only about normal in circumference.

The result was that the forceps slipped five times, and only after great difficulty the head was born, face to pubis. There was a small laceration of the vaginal wall on the left side and this was stitched. The operation and delivery occupied forty minutes.

The diameters of the fetal head were—suboccipito-bregmatic, 4 ins.; occipito-frontal, $4\frac{3}{4}$ ins.; occipito-mental, $5\frac{1}{2}$ ins.; cervico-bregmatic, $4\frac{3}{8}$ ins. The child, a male, was 21 ins. long, and weighed 8 lbs. 15 ozs.

The Puerperium.—The temperature ranged from 98° to 101° F. during the first ten days. On the 2nd day the patient complained of severe pain in the left sacro-iliac joint and down the limb in the line of the sciatic nerve. It was so severe that heroin was administered several times, but the pain disappeared on the 6th day. However, on the 7th day the same sort of pain started in the right sacro-iliac joint, and this continued for 2 days. On the 13th

day the patient sat up in bed, on the 19th she sat on a chair for half an hour, and on the 21st she walked a few steps but complained of pain in the left sacro-iliac joint. This daily got less, and on the 30th day she walked to the Royal Infirmary, where a radiogram of her pelvis was taken by Dr. McKendrick, who measured by his method the conjugata vera, and made it out to be $3\frac{1}{2}$ ins. On the 35th day the patient went home walking well, without pain and without any hesitation. Dr. Young of Slamannan, who sent the patient, tells me that Mrs. W. is very well, but has a very slight limp, which is improving daily.

CASE III.—Mrs. T. W., æt. 27, pregnant for the fourth time, was sent to the Maternity Hospital by Dr. Young, Cowdenbeath, on 11th March 1912.

She had been married four years and enjoyed good health but for occasional nocturnal epileptic fits. Her first child was born dead, instruments being used: the second pregnancy ended in miscarriage at the fifth month: and her third went to full time, when the child was delivered with great difficulty by craniotomy. She was most anxious to have a living child.

The patient was of small stature, and her pelvic measurements were—interspinous, $8\frac{1}{2}$ ins.; intercrural, $9\frac{1}{4}$ ins.; external conjugate, $7\frac{1}{4}$ ins.; diagonal conjugate, $7\frac{1}{2}$ ins.; true conjugate, $3\frac{1}{4}$ ins.

Labour commenced on 17th March at 4 A.M. At 11.50 A.M. the membranes were ruptured artificially and some time was allowed for the head to mould. Forceps were then applied, but neither Dr. Sivright nor I could get the head to engage. Pubiotomy was therefore performed, the forceps being left applied to the head, and after the bone was severed delivery was effected quite easily. The time occupied was 35 minutes, and the reason for delay in this case was the difficulty I had in passing the needle behind the pubis. I had made my incision rather too far out, so that the course to be traversed by the needle was too long and too oblique. The point of the needle impinged against the pubic arch, and it was only with difficulty that I ultimately managed to bring it out through the soft parts below.

The Puerperium.—The patient sat up in bed on the 10th day, and on the 18th she was on a chair for a quarter of an hour, on the 21st she walked without support, and on the 28th she left the hospital, walking with confidence and without pain.

The complication of the puerperium in this case was a slight cystitis. She had retention of urine from the 1st to the 10th day,

and on the 4th day there was some pus and blood in the urine which necessitated irrigation for a few days. When the patient went home the urine was clear and she had no bladder symptoms. Whether this cystitis was due to the catheter or to the operation it is difficult to say.

The child, a male, weighed 7 lbs. 8 ozs., had a large head, and measured 19 ins.

Diameters—suboccipito - bregmatic, $3\frac{1}{8}$ ins.; occipito - frontal, $4\frac{5}{8}$ ins.; occipito-mental, $5\frac{1}{2}$ ins.; cervico-bregmatic, $3\frac{7}{8}$ ins.; fronto-mental, $3\frac{5}{8}$ ins.; biparietal, 4 ins.; bitemporal, $3\frac{1}{4}$ ins.; bifrontal, $2\frac{1}{2}$ ins.

Radiograms of all these cases were kindly taken by Dr. McKendrick. Two show the line of division of the bone very well. Dr. McKendrick tells me that the gap does not indicate that the union must have been fibrous only. Young callus does not give the shadow of ordinary bone, and it might be many weeks before, on a radiogram, the space seemed filled up.

These radiograms distinctly support the contention that one of the advantages of pubiotomy is that the capacity of the pelvis is permanently enlarged, and explain how many cases are recorded in which subsequent labours have been comparatively easy and natural. It is interesting that when the bone is divided separation does not take place at once, but only after the head enters the brim.

These cases I have just recorded being ultimately quite satisfactory, what is one's general impression of the operation and its usefulness? The experience is limited to three cases, but owing to want of continuity of service on the part of the staff at the Maternity Hospital it must be impossible for anyone to record more than two or three cases at a time. It will only be after others have recorded their experience during successive terms of duty that the verdict of the Edinburgh School of Midwifery on this operation can be obtained. Personally I am convinced that the operation is a thoroughly good one in carefully selected cases, and constitutes a most valuable means at our disposal for the management of certain cases of contracted pelvis. No doubt in some respects the puerperium in my cases seemed, at first sight, a little disappointing, but the condition of the patients was never such as to give rise to the slightest anxiety. The convalescence of the first was perfect for three weeks till phlebitis commenced, and it is unlikely that this had anything to do with the opera-

tion. The convalescence of the second was complicated by severe pain in the sacro-iliac joints, but this was entirely my fault. Had I rotated the child from the R.O.P. position, so much separation of the bone would not have been required before delivery could be effected by forceps. In the third case cystitis of a kind supervened, but this may quite well have been from the use of the catheter, and it soon passed off. All the children, too, left the hospital well and sturdy.

The operation itself is an easy one, and although a properly equipped operating theatre is the best place for carrying it out, there is no reason why it should not be undertaken in a private house if special arrangements are made just as have to be made on occasion for other operations. The effect of the operation is to increase all the pelvic diameters; half an inch is added to the conjugata vera, and this benefit is increased to the extent of another half inch by Walcher's position. Further, the space between the divided ends of the bones is available for the bulging into it of the anterior parietal bone. This was pointed out by Sandstein in his paper on "Symphysiotomy," read at this Society many years ago. He also showed that, after division, the innominate bones rotated not only outwards but downwards, and it was the latter movement more than the other which increased the capacity of the pelvis.

The operation should never be attempted in a primipara, because of the certainty of laceration of the soft parts, nor if the conjugata vera is below 3 ins. The pelves which are suitable are those with a conjugata vera of from 3 ins. to $3\frac{3}{4}$ ins., but it is really impossible to fix an upper limit, because all depends on the amount of disproportion between the child's head and the pelvic canal. If it is very great, Cæsarean section should be the operation of choice; if less marked, pubiotomy should be undertaken. Hence in every case a careful estimation of the size of the head is just as important as the measurement of the pelvis. In every case the operation should be merely the complement of the forceps, which should have a thorough trial first. In my first case they were not applied, because I thought they would prove useless, but still I ought to have given them a chance. The operation to secure a living child, which competes most strongly with pubiotomy, is the induction of premature labour. The only objection to this procedure is the serious foetal mortality. Recent statistics show that from 50 per cent. to 70 per cent. die within the first year of life (35 per cent. immediate mortality), and the maternal mortality is $1\frac{1}{2}$ per cent.,

whereas among Schauta's last 50 cases of pubiotomy the foetal mortality was only 6 per cent., and the maternal nil.

In a larger series of cases undertaken in Germany, recent statistics show a maternal mortality of 4.4 per cent., which is just the same as the mortality from high forceps, and with high forceps the foetal mortality is 35 per cent. In other words, in induction of labour the mother has a slightly better chance— $1\frac{1}{2}$ per cent. mortality against 4.4 per cent.; in pubiotomy the child has an infinitely better chance—6 per cent. against, say, 50 per cent. Another very important point is, that cases suitable for induction of labour are frequently seen too late, especially in hospital practice; they are admitted in labour or just before it, and then, if forceps fail, it is too often only a question of choosing between Cæsarean section and craniotomy, pubiotomy being left out of account altogether. As a matter of fact, if the disproportion between head and pelvis be not very great, pubiotomy is really the operation of election, and it seems to me that it would be much easier to get the consent of patient and friends to this procedure than to that which sounds so much more alarming—Cæsarean section. As a matter of fact, as Munro Kerr says in his excellent chapter on pubiotomy, if cases are chosen carefully, and the operation done in hospital, the results are much better than from Cæsarean section. Although the number of cases suitable for pubiotomy must be few, too many such end in craniotomy—an operation which has a maternal mortality of about 12 per cent., and a morbidity yet higher—22 per cent. It is, of course, admitted that these are not entirely to be attributed to the operation, but very frequently to the previous conditions which indicated the craniotomy. There is one paragraph in Sir Halliday Croom's exhaustive paper on "Contracted Pelvis," read before the Edinburgh Obstetrical Society last year, with which I do not entirely agree. He says that in the case of a multipara who has had a child sacrificed in her first labour or induction with a dead child, then, obviously, on the next occasion the election would be, not with pubiotomy, but rather with Cæsarean section or a second induction. He says pubiotomy is not unassociated with grave maternal risk and death. Now, to my mind, these are just the cases, especially those where induction has previously been carried out unsuccessfully, in which pubiotomy should be considered. If a case is suitable for induction of premature labour it is suitable for the operation we are considering. Further, one can scarcely say that an operation is attended by grave maternal risk when the most recent statistics show in a

series of 50 cases not a single maternal death. Pubiotomy should never be done in a septic case, and some authorities hold it should never be undertaken in a suspected case, but others, and especially Tweedy, hold that in such it is preferable to craniotomy, since the mortality in doubtful cases is as high in the one as in the other, with the enormous advantage that the child is saved by pubiotomy. Routh, too, points out that pubiotomy is one of the operations which have been introduced to take the place of Caesarean section in "suspected" cases. He emphasises the enormous difference in the operative mortality of Caesarean section as applied to "clean" and "suspected" cases respectively. For this purpose he collected 1282 cases, and found a death-rate of 2·9 per cent. in cases in which membranes were unruptured at the time of operation, as against a mortality of 17·3 per cent. when rupture had already occurred. To reduce this high mortality various operations have been carried out, and pubiotomy in this class of cases takes its place along with Caesarean hysterectomy and extra-peritoneal hysterotomy.

In conclusion, I wish to thank Dr. Sivright, the house surgeon, for his valuable assistance at the operations, for his care of the patients, and for the careful notes of the cases. Once more I should like to express my indebtedness to Dr. Haultain for granting me the opportunity on which this paper is based.

CHANGES IN THE THYROID GLAND UNDER THYROID FEEDING.

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THE recent work of Reid Hunt¹ on "The Effects of a Restricted Diet and of Various Diets upon the Resistance of Animals to Certain Poisons," and the results of other observers on somewhat closely connected subjects, led me, in the course of last year, to commence a series of experiments on animals with a view to examining into the influence of diet on the occurrence and intensity of infection, with particular reference to the rôle played by the thyroid gland.

On the completion of the first series of experiments my attention was forced to results somewhat foreign to the main tenor of the work. These results were so striking and so

absolutely uniform that I have been constrained on the advice of Professor Schäfer—in whose laboratory in the Physiology Department of the University of Edinburgh the experiments were conducted—to publish them. They show that in all cases in which thyroid was fed to an animal the histological appearances of the thyroid gland of the animals were closely similar, irrespective of diet and of certain experimental infective conditions. They are further of interest by reason of the character of the appearance of these glands, the consequent suggestion as to the degree of their activity, and the bearing such a sidelight on the relationship of thyroid treatment to thyroid function may have on certain phenomena of clinical experience.

The first series of experiments lasted 60 days. For it 24 young male rats were employed, these animals weighing on an average about 100 grms. at the commencement of the experiments.

The animals were separated into cages and treated generally as shown in the following table:—

Cage A1 (2 rats) Diet: Milk and a little cheese			Saline Injections.		
" A2	"	" Oatmeal and water	"	"	"
" A3	"	" Liver and water	"	"	"
" B1	"	" Milk and a little cheese + thyroid	"	"	"
" B2	"	" Oatmeal and water + thyroid	"	"	"
" B3	"	" Liver and water + thyroid	"	"	"
" C1	"	" Milk and a little cheese	Diphtheria toxin, tuberculin (T.R.), staphylococcus aureus vaccine.		
" C2	"	" Oatmeal and water			
" C3	"	" Liver and water	"	"	"
" D1	"	" Milk and a little cheese + thyroid	"	"	"
" D2	"	" Oatmeal and water + thyroid	"	"	"
" D3	"	" Liver and water + thyroid	"	"	"

All the animals were given food *ad libitum* except for the final 24 hours, when nothing but water was given. During this final period 3 rats died, 2 in cage B1 and one in cage D1, the other rat in cage D1 having got out for a short time and presumably obtained food of some kind.

Thyroid was administered in the form of Burroughs & Wellcome's 5-gr. tabloids and of Liquor Thyroidei (B.P.). The tabloids were given powdered in the food, and the liquor in the fluid. Thyroid was given continuously, the amount being diminished for all when any of the rats appeared to be in dangerously low health.

Saline injections were given hypodermically at correspond-

ing times and in corresponding amounts with the hypodermic injections of toxins or vaccines.

Diphtheria toxin was injected 6 times, 3 injections each of 15 times the minimum lethal dose for a guinea-pig, and 3 injections each of 125 times the minimum lethal dose for a guinea-pig.

Tuberculin (T.R.) was injected twice, each time in the dose of $\frac{1}{12}$ mgrm.

Staphylococcus aureus vaccine was injected 3 times, each time in the dose of twenty thousand million cocci.

The following clinical observations were made:—(1) Bacterial and toxic injections produced no obvious effect. (2) The nature of the diet influenced markedly the general condition and growth of the animals. (3) Thyroid administration tended in all cases to produce emaciation, the degree of its action varying with the diet.

Though somewhat outside the scope of the present communication, it is of interest to note generally the effects of dietetic and thyroid treatment.

The accompanying charts (Fig. 1) of weight curves to scale demonstrate the rate of growth.

On a milk diet (see curves $A_1 B_1 C_1 D_1$) the animals appeared sleek and healthy without thyroid, but rapidly became extremely emaciated and weak with thyroid. One animal of the 24 employed was considerably older than the others, and as its growth in the natural course of events was comparatively slow, the curve A_1 shows less increase than might reasonably be expected to have occurred had all the animals been of the same age.

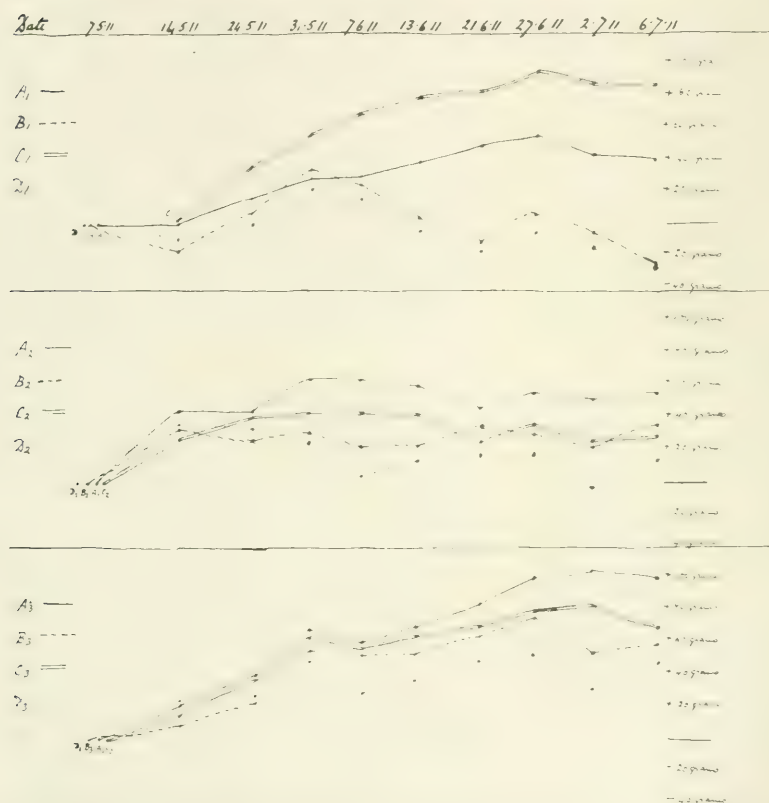
The liver diet (see curves $A_3 B_3 C_3 D_3$) proved most uniformly satisfactory. The animals fed on it were sleek and healthy, gained satisfactorily in weight, but were thin when having thyroid.

The animals fed on oatmeal (see curves $A_2 B_2 C_2 D_2$) were much the least satisfactory as regards general appearance and increase in weight. After the first few days they never appeared in good health, whether receiving thyroid or not.

The effect of thyroid administration was marked in all cases, the general tendency being to produce emaciation.

While, however, the effect of thyroid administration was marked in all cases, it distinctly varied in degree according to the diet. The effect was much strongest with milk diet and weakest with oatmeal diet.

With a milk diet thyroid almost entirely prevented growth in weight and eventually led to death, although until shortly before death these animals, while extremely emaciated, did not



The upper series of curves refers to animals fed on a diet of milk and cheese.

The middle	outside bed	wasted
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The lower " " " " " liver and water.

Each curve represents the average weight of the animals concerned.

The A	curve (1, 2, and 3)	deals with animals fed on the particular diet + saline injections	(—)
The B	"	"	"
The C	"	"	"
The D	"	"	"
		+	"
		+	thyroid (---)
		+	toxin and vaccine
			injection (=)
		+	toxin and vaccine
			injection + thyroid (.....)

but such growth naturally on this diet was very slight, and so the effect of thyroid was not very marked. Rats fed on oatmeal, however, without thyroid appeared much less healthy than those fed on milk or liver, and consequently it was noticeable that the effect of adding thyroid to oatmeal was less marked than adding thyroid to either milk or liver.

Clinically, therefore, distinct variations in health were noticeable according to the diet employed and as a result of thyroid administration.

Some of the animals who were not receiving thyroid appeared at the time when they were killed in robust health, while some were weakly. Of those who received thyroid 3 died a natural death (milk), 4 were apparently in good health (liver), and 4 were weakly (oatmeal),

Histological examination of the thyroid glands showed a very distinct separation of two pictures, the one of glands from animals to whom thyroid had been fed, and the other of those from whom it had been withheld.

Further, the appearances of the glands from the thyroid-fed animals were absolutely uniform, and in no instance did the gland from an animal to whom thyroid had not been administered at all resemble them.

To the naked eye no peculiarities were noticeable, either as regards size or colour. The organs were fixed in formalin, and sections were cut and stained with hæmatoxylin and eosin. The spleen, liver, kidney, and suprarenal were examined as well as the thyroid gland, and I have to thank Dr. James Miller for corroborating my observations and giving me a report upon the sections.

Report by Dr. James Miller.—"The following report of appearances in a series of thyroid glands and in the organs—spleen, liver, kidneys, suprarenals—from the same animals refers only to the more obvious alterations.

"*Thyroid Glands*—Series A and C.—The cells lining the acini of the thyroid gland are cubical, their protoplasm is granular, their nuclei rounded and staining uniformly well. The larger vessels and the capillaries between the gland spaces are distended with blood. Colloid material is either absent from the spaces or present in small amount. When present it is granular in appearance.

"In certain cases there appears to be a slight catarrhal condition of the cells lining some of the acini.

"On the whole, however, in these two series the appearances do not differ much from the normal.

"Series B and D (*i.e.* animals to whom thyroid was fed).—The most striking difference between these and the A and C series is in the amount of colloid material. Practically all the acini are distended with homogeneous-looking colloid, staining intensely with eosin. Another change is to be seen in the cells, which are flattened and spindle-shaped. There appears to be no great difference in vascularity between the two groups. On the whole the inter-tubular capillaries in series A and C appear to be more prominent than in series B and D. (Plate I.)

"The impression one gets from comparing the two series is that in A and C the glands are actively secreting, and that the colloid is being rapidly absorbed. In B and D the colloid is retained and accumulating, leading to distension of the gland spaces and flattening of the lining cells.

"After careful comparison of the different individuals of the two series no variation is observed which could not be accounted for by slight variations in level of section, in fixation, or staining. An exception must be made in the case of one animal which shows a well-marked tracheitis.

"*Other Organs.*—In the case of series B and D both liver and kidneys appear to be more vascular than those in A and C. In the case of the spleen, however, this does not appear to hold good. If anything, the spleens of series A and C are more vascular than those of B and D."

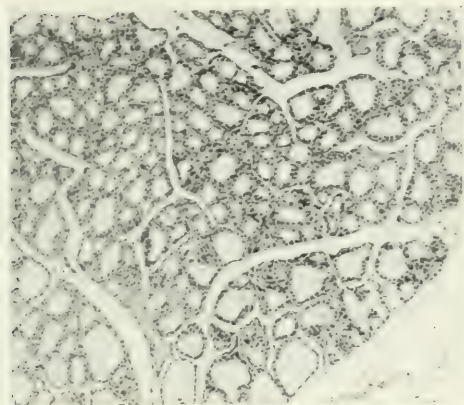
The histological changes resulting from thyroid administration appear therefore to have affected the whole body so far as examined, but to have been specially marked in the thyroid gland.

The significance of the changes in the thyroid gland I cannot tell, but there appear to be grounds for believing that the effect of the administration of large doses of thyroid has been to cause partial inactivity of the gland, this inactivity being more particularly in relation to the absorbing and distributing function of the glandular cells.

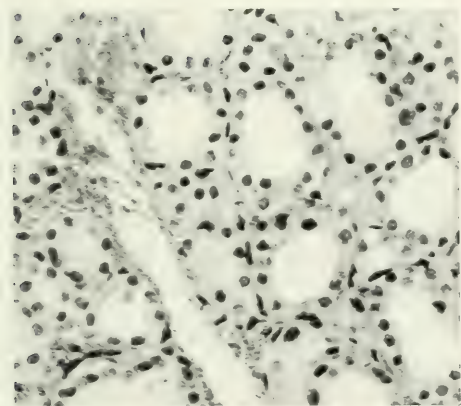
In support of such a hypothesis I would quote some results obtained from another series of experiments. This series comprised 16 young rats. Eight were fed for a month on a general laboratory diet of bread and milk, and 8 were fed on milk and cheese. Half of each number (4 rats) were also given thyroid as in the previous experiments.

PLATE I.

EXAMPLE OF SERIES A AND C.

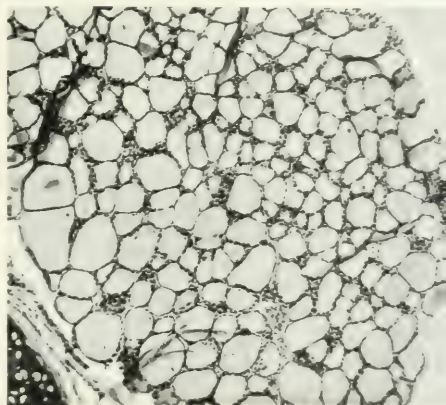


Milk and cheese (A 1) $\times 100$.

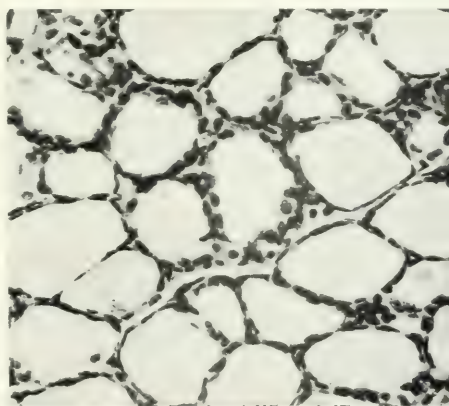


Milk and cheese (A 1) $\times 350$.

EXAMPLE OF SERIES B AND D.

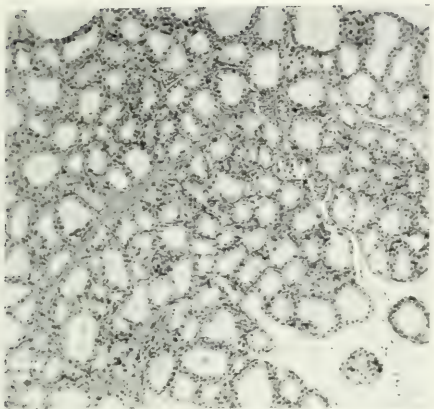


Milk and cheese and thyroid (B 1) $\times 100$.

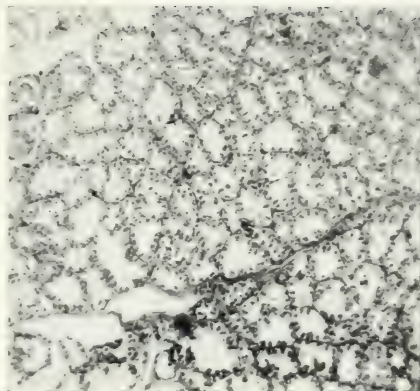


Milk and cheese and thyroid (B 1) $\times 350$.

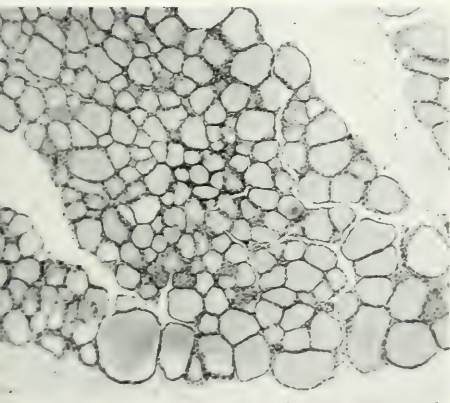
PLATE II.



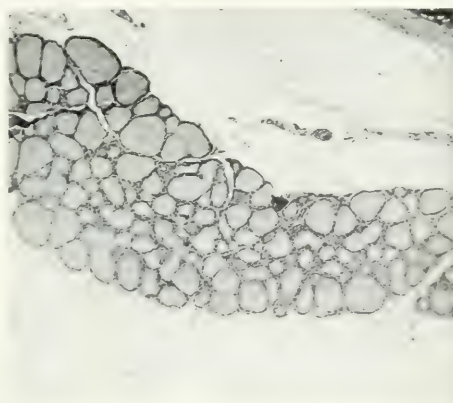
Milk diet — (killed control) $\times 100$.



Milk diet + coli injection (killed 24 hours after coli injection) $\times 100$.



[Milk diet + Thyroid — (killed control) $\times 100$.



Milk diet + Thyroid + coli injection (killed 24 hours after coli injection) $\times 100$.

Of both sets of rats on the two diets 1 rat which was receiving thyroid died in the course of the experiment.

Two of the animals on the bread and milk diet and two of those on the milk and cheese diet were killed at the end of a month as controls, and one of those on each diet which was also receiving thyroid was also killed.

The remaining 8 rats were each injected intra-peritoneally with $\frac{1}{2}$ c.c. of a pure culture of bacillus coli communis.

All the 4 rats fed on milk and cheese were alive 24 hours afterwards, and were then killed. Of the 2 rats fed on bread and milk one was alive and was killed, the other was dead, and the same held good of the 2 rats fed on bread and milk and to whom thyroid had been administered.

Histological examination of the thyroid glands showed a practically uniform appearance—similar to that in the previous experiments—in the glands of those animals who had been receiving thyroid whether they had been inoculated with the coli culture or not, whereas the glands of the animals untreated with thyroid showed marked changes as the result of the acute infection. (Plate II.)

Such results appear to me to strengthen the view that the result of thyroid administration had been to diminish in certain directions the activity of the thyroid gland.

The observations of Carlson (A. J.) and Jacobson (C.),² of Thompson (F. D.),³ and of Marine (D.) and Leuhart (C. H.)⁴ to some extent bear out this interpretation of appearances of glands such as I have found.

Comparatively little work has been done on the results of thyroid administration on the thyroid gland.

Peiser⁵ studied the subject in rats with varying results, and Utterström,⁶ working with rabbits, found that the thyroids of animals treated with thyroid showed uniformly an abnormal increase of the number or size of the cysts.

The striking and uniform nature of the results obtained led me to seek for information respecting the interpretation of appearances in the thyroid gland in relation to the activity of that organ.

Definite information on the subject is, however, not at present extant.

My experiments show that in young rats the administration of thyroid produced constant definite changes in the thyroid glands. That similar changes always occur is open to doubt, and

that the results in human beings are the same as those in rats is improbable.

Clinically we expect certain results from thyroid administration in a variety of types of cases. The results, however, differ markedly in the different types of cases.

The complex nature of thyroid function is recognised by scientists and well evidenced by the voluminous reports of clinical observers.

Thyroid is a potent drug to improve or disturb general metabolic processes. The indications for its employment are apparently manifold, but their exact nature is certainly undefined, and dosage is largely a matter of conjecture and experiment.

REFERENCES.—¹ Reid Hunt, Hygienic Laboratory, Bulletin No. 69, Treasury Department, Public Health and Marine Hospital Service of the United States, June 1910. Reid Hunt, *Journ. of Amer. Med. Assoc.*, 23rd September 1911, vol. lvii. pp. 1032 and 1033. ² *Amer. Journ. of Phys.*, 1910. ³ *Philos. Trans. of Roy. Soc. of London*, 1910, Series B, vol. cci. pp. 91-132. ⁴ *Johns Hopkins Hosp. Bull.*, May 1909, vol. xx. No. 218. ⁵ *Zeitschr. f. exper. Path. u. Ther.*, 1906. ⁶ *Arch. d. Méd. Expér.*, 1910.

MEETINGS OF SOCIETIES.

Forfarshire Medical Association.

A CLINICAL meeting of this Association was held in the Infirmary, Forfar, on 17th May. Dr. Angus MacGillivray, Dundee, presided.

Dr. Burgess, Forfar, showed two *cretins* aged eight and six years respectively in whom an unusual symptom, namely, stiffness of the joints, had been present. He also showed a case of *neuralgia of the leg* in a young man. The pain, which was at times severe, was of unknown origin, and such causes as tuberculosis and rheumatism could be excluded. Dr. Burgess then demonstrated a case of *ulnar paralysis* in a young man. There was a history of a fall, but the paralysis was limited to three fingers. Mr. Greig, Dundee, in commenting on the above series of cases, suggested that in the last case the paralysis had resulted from poliomyelitis anterior acuta of limited range.

Dr. Macalister, Forfar, read a paper on "Hedonal Anaesthesia." He had had the opportunity recently of seeing the operation of transplantation of the ureters performed on a patient under its influence. A perfect degree of general anaesthesia was produced and lasted for the duration of the operation, which took two hours. The technique of administration was described, and Dr. Macalister mentioned that in this particular operation 1500 c.c. of a .75 per cent. solution of hedonal in normal saline were transfused into a vein at the ankle. There were no unpleasant after-effects, and the impression given was that it was a valuable method of producing general anaesthesia

Hebdomal is excreted as urea, and the question of the advisability of administering it in Bright's disease at once arose.

Mr. Price, Dundee, showed various specimens—(1) Paget's disease of the nipple in a man aged 48. (2) Branchial cyst of dermoid type. (3) Spindle-celled sarcoma removed from the frontal region of a man who had suffered from tuberculous disease of the sacro-iliac region, ribs, sternum, and ulna. (4) Kidneys with abscesses containing inspissated pus from a case in which implantation of the ureters into the pelvic colon had been performed for carcinoma of the bladder. (5) Sequestrum from fibula which had been resected subperiosteally. X-ray photographs of similar cases were also shown.

Mr. Price also read a paper entitled "Notes on Two Cases of Intestinal Obstruction," which will appear in the *Journal*.

Dr. Pirie, Dundee, read a paper entitled "Diagnosis of Stomach Disease by X-Rays," which will appear in the *Journal*, and showed numerous radiograms.

Scottish Otological and Laryngological Society.

THE fourth meeting was held in the Royal Infirmary, Glasgow, on Saturday, 11th May, under the chairmanship of Dr. J. Kerr Love.

Dr. Kerr Love gave a short but most interesting survey of the oral method of educating the deaf, drawing special attention to the value of remains of hearing in the retention or acquisition of speech by those who have become deaf in early childhood. Some people were inclined to think that the expense and trouble of teaching deaf-mutes to lip-read and to speak was not compensated for by the degree and quality of speech attained to, but he did not think that one was justified in expecting such a high standard that the subject could go about as the normal hearing person and make himself understood to the same extent. Yet it could not be gainsaid that the power of being able to converse with those about him, of being able to comprehend their wants and make known his own in a language which all understood was of inestimable value, even if he could not make out what was said from the pulpit or speak sufficiently clearly to the booking-clerk at a railway station. Dr. Love protested against the popular idea that deaf-mutes were mentally deficient. There was not a greater proportion of such among them than among hearing children. Unless there were other stigmata of mental deficiency one had no right to put the deaf-mute in this category. They were quite as sharp and capable of as great development as normally-hearing children. This was borne out by the children who were present to illustrate his remarks. With the assistance of Miss Douglas, a teacher of the deaf, a demonstration of methods of teaching lip-reading and speech was given, some of the children showing remarkable ability and intelligence. Attention, too, was drawn to the pleasanter and more modulated voice of those in whom there was some residual hearing.

Dr. J. S. Fraser gave a lantern demonstration of the inner ear from cases of congenital deafness, showing the changes which were found, especially in the organ of Corti, Reisner's membrane and the membrana tectoria.

Dr. Albert Gray gave a lantern demonstration of the changes in the ear in otosclerosis, showing the changes in the labyrinthine capsule, especially in the neighbourhood of the oval window. He referred briefly to the various theories

of the causation of this condition, and remarked that the difficulties were not yet solved, and that much more work would be required before they were. There were no demonstrable changes in the nerves in uncomplicated cases of otosclerosis. While he agreed with Dr. Fraser that some cases probably arose secondarily to middle-ear conditions such as suppuration, the majority, he thought, had not a middle-ear origin.

Dr. Kerr Love showed two patients who had been operated on for brain abscess complicating middle-ear suppuration, one a cerebral and the other a cerebellar abscess. He also showed a man whose left external ear and surrounding structures he had removed six months ago for malignant disease. A recurrence in the mastoid process had since been removed, together with the bone. Since then X-ray treatment had been adopted, but it was possible that already there was glandular involvement.

Dr. James Adam showed a woman with a bony swelling on either upper jaw, involving the alveolus and the anterior antral wall. He considered these growths to be of the nature of hyperplastic osteitis of infective origin. Several members looked upon them as dentigerous cysts, while Dr. Kelly suggested that from the symmetry it might be leontiasis ossea.

Dr. Adam also showed a patient, a female, with a well-marked tortuous carotid on the posterior pharyngeal wall. He also brought before the Society two boys under treatment by split tooth plates to widen the nasal passages. In one boy, aged 15, the palate had expanded 4 mm. in four months and in the other, aged 10, 7 mm. in five months. In both, the benefit to the nasal respiration appeared to be decided. A discussion ensued as to the nature of this expansion, Dr. Turner expressing the view which was held in America, where this method had had more extended trial, that there was separation of the intermaxillary suture.

Dr. P. N. Grant showed two patients with ulceration of various parts of the nose, one showing a pure pneumococcal infection, the other a mixed infection—pneumococcus and other organisms. Both were under treatment by vaccines. Some members considered the former case, at any rate, to be syphilitic.

Dr. Walker Downie showed a female, aged 42, with an extensive venous angioma affecting the right side of the forehead, nose, upper lip, and right half of palate. The condition had been stationary for twenty years till a few weeks ago, when the lip portion began to extend. He also showed another case with a swelling on the left side of the nose externally. He was doubtful whether it was a sebaceous cyst, a lipoma, or a venous condition, but on puncturing it found it to be the last.

Dr. J. G. Connal showed a patient on whom he had operated for septic thrombosis of the lateral sinus with extra-dural abscess consequent on middle ear suppuration. The external jugular was tied and the sinus opened and drained. He also showed a man with a large exostosis of the external auditory meatus. There was still a small chink, so that the patient heard fairly well. As there were no disturbing symptoms he did not think operation was called for.

Dr. Brown Kelly showed four patients illustrating the value of the direct method in the diagnosis of laryngeal conditions. Two of these, brothers aged 3 and 5, were the subjects of prolonged adductor spasm. The children are much below the normal size, are very rickety, and show signs of delayed mental development. In the younger boy the respiration became so difficult

that tracheotomy had to be performed. The condition was at first thought to be abductor paralysis, but as improvement had taken place no doubt the designation adductor spasm was correct. A twin brother of the older boy who had had crowing at night on several occasions was also examined, but nothing abnormal was found.

Dr. Syme referred to the great interest of these two cases with reference to the general question of laryngeal stridor in children. He thought it would be found, now that the direct method of examination was available, that many cases of so-called laryngismus stridulus were really examples of adductor spasm of central origin, and not due to structural alterations or defects in the framework of the larynx.

Dr. Fullerton referred to an interesting case of probably similar nature which had come under his observation and which he had reported at length some time ago.

Dr. Adam looked upon the condition as related to asthma, and due in great measure to errors in feeding.

Dr. Kelly's third case was also one of laryngeal stridor, but in this case, an infant of 20 months, direct laryngoscopy showed a long tapering epiglottis rolled backwards so as to bring the aryepiglottic folds almost into apposition. During inspiration the arytenoids were drawn forward, the flaccid tissue on their summits made to vibrate, and the glottis was reduced to a small quadrilateral chink.

Dr. Turner discussed the actual cause of the stridor in cases of this nature.

The fourth case shown by Dr. Kelly was one of compression of the bronchi and œsophagus in a man of 27. The examination of the larynx revealed left recurrent paralysis. Bronchoscopy showed occlusion of the left main bronchus and flattening of the right. On œsophagoscopy the œsophagus was seen to be obstructed by a smooth-lobed bulging of the anterior wall. There was no abnormal pulsation to be seen anywhere. The underlying disease was probably a rapidly-growing neoplasm of the posterior mediastinum. Examination for tubercle was negative.

Dr. Fraser referred to a case showing somewhat similar conditions on bronchoscopy, which on post-mortem examination proved to be a sarcoma of the mediastinum.

Dr. Brown Kelly also showed an infant of 4 months suffering from a gonococcal infection of the nose.

Dr. W. S. Syme showed an infant of two months with bony occlusion of the posterior nares. The mother's attention was drawn to the nasal obstruction by the fact that the child was unable to breathe when taking the breast. The nostrils contained sticky purulent discharge, and with a probe the bony diaphragm could be distinctly felt; the probe could not be passed into the nasopharynx. It was thought that at present, at any rate, operation would lead to no satisfactory result. Dr. Syme also showed a boy with congenital fenestration of the faucial pillars. He had suffered from no inflammatory affection of his throat. Dr. Syme reported a fatal case of abscess of the brain and leptomeningitis as a complication of posterior ethmoidal and sphenoidal disease. The patient, a woman of 25, had suffered from post-nasal discharge for some years. A month previous to coming to hospital she developed severe headache, rigors, and vomiting. There was found destruction of the roof of the ethmoid and a ragged opening in the dura through which necrosed portions

of the brain protruded. The probe passed into a deep-seated abscess cavity. The question of reaching this by an external operation was considered, but in view of its position, and of the great probability of concomitant meningitis, this was negatived. Post-mortem examination showed a large opening in the roof of the posterior ethmoidal cell, destruction of the dura and of the surface of the brain in the neighbourhood, and a narrow abscess cavity leading from this part just beneath the under surface of the frontal lobe backwards till it opened into the third ventricle.

The members and friends afterwards dined together. It was decided to hold the next meeting in November in the Royal Infirmary, Edinburgh, under the chairmanship of Dr. J. S. Fraser.

Edinburgh Medico-Chirurgical Society.

A MEETING was held on 5th June, Mr. J. M. Cotterill, President, in the chair.

Mr. Scot Skirving showed two patients after *resection of bone*. One was a boy, aged 12, whose tibia had been resected subperiosteally for tuberculous osteomyelitis. After 5½ months there was no reproduction of bone. Firm union took place after transplantation of the opposite fibula. The second case was a youth of 17 who had chronic osteomyelitis and sinuses. Resection of the fibula corresponding to the gap in the tibia and wiring failed. Firm union was obtained after the use of Lane's plates.

Dr. Edwin Bramwell showed a case of *myotonia atrophica* in a woman aged 36. The patient had paresis of the lower limbs, affecting the anterior tibial, peroneal, and quadriceps groups. The sterno-mastoids and face were weak. The grip was weak, and there was difficulty in relaxing it. The infraspinatus was enlarged.

Mr. Struthers showed a patient after amputation at the shoulder for *acute arthritis and osteomyelitis associated with syringomyelia*. A large abscess extending from the shoulder to the elbow had formed, but failed to heal after it was opened. Sensory impairment was so great that the amputation was performed without any anæsthetic.

Dr. Watson Wemyss, for Dr. Gibson, showed a case of *acromegaly*, and a case of *myxœdema*.

Mr. Cathcart showed a case of *cerebral diplegia* in a young girl. The adductor tendons and the tendo Achillis had been resected on both sides. The patient could stand and was learning to walk, and had improved greatly in general health since the spasm of the muscles had been abolished.

Mr. Struthers showed specimens of the knee-joint in Charcot's disease, and of arthritis and osteomyelitis in syringomyelia.

Mr. L. Storrow Shennan, L.D.S., read a paper on *The Care of the Teeth in Relation to the Health of Children at the School Ages—the Provision of Special School Dental Clinics*, which will appear in the *Journal*.

Dr. Guy said that so far as Scotland was concerned the question was not so much the advisability of attention to the teeth of school children as an administrative, economic, and perhaps political question regarding the means by which attention might be given. He questioned very much whether the cost per tooth of dental clinics would be any less than the fee charged by reputable dentists in private. It was certainly a question whether the school clinic was

the best way to attack the problem in Edinburgh. The children could be attended to in hospital at less cost than in school clinics, and they provided clinical material which was most necessary for carrying on the educational work of a dental hospital.

Dr. James Ritchie believed that much of the dental caries in children was due to food. In cases where the teeth had been attended to he had noticed a less incidence of enlarged glands and tonsils.

Dr. M'Crae Taylor mentioned that in an inspection of 300 volunteers, which he had made some years ago, less than six of the men had a good set of teeth.

Dr. J. S. Fowler asked for some guidance as to the dietary suitable for children. It might be difficult to arrange a dietary which was unfavourable to caries and suitable in other respects.

Dr. Theodore Shennan referred to the influence of the condition of the temporary on the permanent teeth and the effect of cheap sweets. Some children had a better equipment of enamel than others.

Dr. James Smith referred to the statistics regarding dental caries in the reports to Edinburgh School Board. The School Board must limit its activities to necessitous children.

Dr. Gibbs said that the question of attention to the teeth of school children was largely one of finance. While 80 per cent. of children had carious teeth, at least 90 per cent. of the teeth were carious. Carious teeth increased with the consumption of soft food and sugar. The best tooth application was normal saliva, and for that reason fruit, and especially acid fruit, was of great service, as it brought about a prolonged flow of saliva.

Mr. Struthers gave a lantern demonstration on some appearances presented by the acromion process and upper end of the humerus during ossification and on separate acromion process.

Variation in the appearances presented by radiographs due to alterations in the position of the limb were clearly demonstrated. Two cases of separate acromion process were also shown. It was important that when the X-ray picture of an injured shoulder showed an apparent fracture of the tip of the acromion process a photograph of the other shoulder should be taken in order to exclude the possibility of the presence of this bilateral anatomical peculiarity.

Edinburgh Obstetrical Society.

THE last meeting of the session was held on Wednesday, 12th June, Dr. Haig Ferguson, President, in the chair.

Specimens were shown by Dr. Haultain, Professor Kynoch, Dr. W. Fordyce, and Dr. R. W. Johnstone.

Professor Kynoch read a communication *On Axial Rotation (Cervical Torsion) of the Mucous Uterus, with Notes of a Case.*

In some introductory remarks on the clinical importance of uterine rotation the author mentioned— 1 The occurrence of a rare form of post-partum shock due to forcible pressure on the left ovary against the contracted uterine wall in the third stage of labour; (2) in performing Caesarean section rotation, if met with, must be undone before making the uterine incision; (3) it was a rare cause of obstructed labour; 4. it might give rise to symptoms resembling

those of extra-uterine pregnancy: (5) it might cause fatal intra-uterine hemorrhage.

Fibroid or ovarian tumours might cause axial rotation of the pregnant uterus, and give rise to serious or fatal consequences. Cases of this nature reported by Cappie, Rheinprecht, Thorn, Lepage, Holowko, and Dickinson were referred to.

Axial rotation of a non-pregnant uterus might be brought about by—1st, torsion of the pedicle of ovarian cyst; 2nd, torsion of the broad pedicle of a subserous fibroid; 3rd, much more frequently by cervical torsion associated with an interstitial fibroid in the wall of the uterus.

Axial rotation as the result of torsion of the pedicle of an ovarian tumour was specially common during the puerperium, and the symptoms were usually referable to the ovarian rather than to the uterine twist.

In the case of torsion of the pedicle of a subserous fibroid the effects are generally referable to the tumour itself, and more rarely was the uterus involved in the twist.

The torsion of the ovarian pedicle was continued on to the corresponding side of the uterus, which rotated in the same direction; cases of torsion of a fibroid in which the uterus participated in the torsion had been recorded but were much rarer.

It was important to distinguish the latter from a much rarer condition of torsion of the myomatous uterus on a greatly elongated cervix. Cases of this rarest variety had been recorded by Haig Ferguson, Virchow, Frommel, Schröder, Schultze, and to this category belonged the case now reported by the author. These had been classified by Schultz according to the degree of rotation—(1) Where the degree of rotation was under 180° , of 15 cases only 2 gave marked symptoms, and these were complicated by pregnancy; (2) where rotation was about 180° acute symptoms arose in 6 out of 16 cases; (3) where rotation exceeded 180° , in these symptoms were frequently acute and associated with great elongation, thinning, and torsion of the cervix, amounting in some cases to almost complete separation of the body from the cervix. The severity of symptoms did not always correspond to the degree of rotation, but rather to the suddenness of the onset. Bladder symptoms were rare. In acute cases the symptoms were similar to those of axial rotation of an ovarian cyst. The prognosis from immediate operation was as favourable as in uncomplicated hysterectomy.

The author then reported the following case:—Patient, æt. 56, unmarried, admitted to Dundee Royal Infirmary 11th January 1912. Twelve years ago she detected a tumour in the abdomen, which gave slight discomfort but gave rise to no symptoms, and her doctor did not advise treatment. Menstruation had been regular, of 3 to 5 days' duration, till it ceased 6 years ago. A month before admission she was suddenly seized when turning in bed with acute abdominal pain, followed with retention of urine, necessitating the use of the catheter for 10 days. There was marked constipation and symptoms of acute intestinal obstruction with collapse. On examination in hospital she presented the appearance of a patient suffering from concealed uterine hemorrhage. Pulse, 120; temperature, 102° . Abdomen was enlarged to size of a 7 months' pregnancy by a hard tumour tender to pressure. On opening the abdomen a considerable quantity of blood-stained ascitic fluid escaped. There were universal adhesions to the parietal peritoneum. The tumour was of a dark

purple colour and hard; with some difficulty it was pulled out of the abdominal cavity and found to have a pedicle formed by the elongated cervix about the thickness of a finger and twisted $2\frac{1}{2}$ turns from left to right. This was transfixed and ligatured. The abdomen was irrigated with hot saline and a glass drainage tube introduced. Except for slight passing pyuria recovery was uninterrupted. The tumour proved to be an interstitial fibroid growing from the top of the uterus. The tubes and ovaries which participated in the torsion, the uterine cavity, and tumour presented all the appearances of extensive hæmorrhage. The whole tumour weighed 15 lbs.

From a study of reported cases it would appear that pain associated with a uterine fibroid was more frequently due to slight torsion than was generally supposed, and that cases of acute axial torsion of the uterus must be regarded as one of the gravest risks to which women with uterine fibroids were liable, and therefore demanding prompt operative interference.

Dr. Haultain communicated *Two Examples of the Difficulty of Diagnosis of Ectopic Pregnancy*.

The cases were as follows:—

CASE I.—Mrs. McA., æt. 25, one full-time child aged 5, was sent to the author on 26th January 1912 to attend in her confinement, which was calculated to be due on 10th February, as her medical attendant considered she suffered from a sacculated gravid retroverted uterus.

On examination an abdominal swelling having the consistence of an advanced pregnancy could be seen and felt extending, chiefly on the right side, to 2 ins. above the level of the umbilicus. The foetal head could be palpated at its upper extremity. On vaginal examination the pelvis was found filled by a soft rounded swelling palpable behind the post-vaginal wall and giving unmistakable signs of foetal small parts. The cervix was high above the pubis and difficult to reach. The pregnancy had been associated with a certain amount of discomfort but no severe pain, except on 25th December, which lasted for a day, and again on 25th January, when she felt also as if something had come down. Foetal movements had ceased since 16th January. No special urinary symptoms.

As for 3 days she had been violently sick and temperature had risen to 101·5 and pulse 130, and no foetal heart-sounds could be heard, it was considered justifiable to induce labour. Under an anæsthetic the cervix was gripped by a vulsellum and 2 gum elastic bougies pushed into the uterus for 9 ins., their tips being distinctly felt in the upper zone of the abdominal swelling close to the foetal head. After 4 days' discomfort simulating labour pains was experienced, the bougies were extracted, and the os being patulous, a finger was introduced with a view to further dilatation, when to Dr. Haultain's surprise no foetus could be felt *in utero*. The diagnosis of extra-uterine pregnancy being now clear, the abdomen was opened on 2nd February. A considerable quantity of free intra-peritoneal fluid was present. The foetus was found in a complete sac which dipped deeply into the pelvis and surrounded the head of the foetus at its upper end. The sac was closely adherent and required careful separation from the intestines. The body of the uterus was pulled high up by the adherent distended sac, and the placenta was found embedded in the depths of the pelvis adherent to Douglas's pouch. Because of the extensive adhesions it was decided to remove the uterus and appendages with the sac. She stood the operation well and made a good recovery.

The specimen showed the pregnancy to arise from the right tube, while the sac was composed of fetal membranes covered by lymph. The fetus measured 18 ins. and weighed 3 lbs. 9 ozs. The uterine cavity contained a semi-detached decidua, evidently in the process of expulsion. The length of the uterus—7 ins.—was mainly accounted for by the lengthening of the stretched cervix.

CASE II.—Mrs. S., married October 1910, two months later, after one week's amenorrhoea, was suddenly seized with severe abdominal pain and tenderness, chiefly on the left side, associated with fever. Symptoms gradually disappeared after 6 weeks' treatment in bed. Eight months later a similar condition was experienced, though the pain was now more severe on right side. After this she never felt quite free from discomfort although able to be about. Menstruation was most irregular. In February Dr. Haultain was asked to see her for a recurrent similar attack of abdominal pain, particularly severe on the right side, with fever; menstruation still very irregular.

A distinct tender swelling was felt to the right of the uterus and an indistinct matting of the left appendages, which were also tender on pressure. Salpingitis, probably purulent, was diagnosed. As patient was very averse to operation she was put into a nursing home for a prolonged course of douching and other suitable treatment. After 3 days in the home she was suddenly seized with much increased abdominal pain, and after a considerable amount of vaginal haemorrhage passed a triangular membranous cast, evidently from the uterus. This she said had occurred on each of the previous attacks. Microscopical examination of the cast showed it to be of a decidual nature.

Removal by laparotomy was at once undertaken. On opening the abdomen a considerable amount of free fluid was found in the peritoneal cavity and the right Fallopian tube was distended by an apoplectic ovum. The left Fallopian tube appeared normal though thin and somewhat atrophic; its abdominal extremity, however, was closely adherent to the surrounding tissues. The pregnant right tube was removed and the left tube freed from its adhesions.

These two cases might be said to illustrate the extremes of ectopic pregnancy, yet both were typical examples of the difficulties which might beset the diagnosis.

In Case I. the comparative absence of abdominal pain, the complete amenorrhoea and physical signs more closely simulated a sacculated pregnancy than the real condition. The passage of the bougies so far into the uterine cavity and the detection of their tips by palpation close to the fetal head above the level of the umbilicus seemed still further to strengthen this supposition.

In Case II. the sudden attack of pelvic inflammation shortly after marriage and its recurrence on two subsequent occasions, with the irregularity of menstruation, were all strongly suggestive of gonorrhoeal salpingitis, while the annexal thickening and adhesion with tenderness on palpation only tended to corroborate the symptoms. Whilst there was no absolute proof that the previous attacks were due to early tubal abortions, when the passage of uterine casts on each occasion was considered, it seemed to offer a more reasonable diagnosis than any other; and the author would watch the patient's future progress with much interest, now that the left tube was free and offered the opportunity of a subsequent similar condition.

Dr. R. W. Johnstone read a paper on the specimen of *Chorioangioma of the Placenta*, which he exhibited, and demonstrated its structure by means of lantern slides. The specimen showed the tumour to consist of a large number of lobules of different sizes, packed together into a mass about 3 ins. by 4, situated at the edge of the placenta. There were one or two large vessels running direct from the base of the cord to the tumour, where they broke up, and the individual lobules were attached to pedicles consisting of the branches of these vessels. The lobules were covered by chorionic epithelium, both Langhans' layer and the syncytium being visible at many parts. This epithelial covering was reflected on to the vascular pedicles, and ensheathed them. Under the epithelium many of the lobules showed a layer of delicate myxomatous tissue, which gave them a gelatinous appearance to the naked eye. Below this lay the proper structure of the lobules—a multitude of delicate capillaries full of blood, supported by an elementary connective tissue stroma.

After referring to the cases recorded in the literature—some seventy in number—Dr. Johnstone discussed the origin of the tumour. In all probability it is due to some abnormal vascularisation of a primitive cotyledon, in which there occurs a venous stasis. In this specimen there was a definite constriction in a large vein passing direct from the tumour to the cord which, if present at a very early stage of development, might have stimulated the capillary loops of a group of villi to this relatively enormous angioma formation.

The tumour appeared to have no direct effect on the pregnancy, or labour, or upon the child, but indirectly it frequently caused hydramnios and premature labour—as was the case with the present specimen.

RECENT LITERATURE.

CRITICAL SUMMARIES AND ABSTRACTS.

MEDICINE.

By W. T. RITCHIE, M.D., F.R.C.P.,
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THE TREATMENT OF PULMONARY PHTHISIS BY ARTIFICIAL PNEUMOTHORAX.

THIS method of treatment, which has been given an extensive trial since the publication of papers by Professor Carlo Forlanini of Pavia in 1894, is discussed in several recent communications. The treatment aims at compressing and immobilising the diseased lung by injections of nitrogen into the pleural cavity, with the object of bringing the walls of pulmonary cavities into apposition with one another, and thus promoting drainage of the lung and the natural process of repair in the diseased organ.

The Indications for Artificial Pneumothorax.—It is generally assumed that the most suitable cases are those in which only one lung is involved, and particularly when the disease is chronic or subacute. Schlesinger (*Wien. klin. Wochenschr.*, 1911, 1717) maintains that treatment by artificial pneumothorax should only be tried in carefully-selected cases, namely, those with extensive disease of one lung and no recent affection of the other. The extent of the disease in the affected lung and the functional efficiency of the other should be ascertained as fully as possible, and preferably by the Röntgen rays rather than by any other clinical methods, before an attempt is made to establish a pneumothorax. One lung may be compressed with safety although a considerable portion of the other lung is involved by a chronic, quiescent, cicatrised lesion, whereas a more acute condition would contra-indicate operation. Klemperer (*ibid.*, 2285) considers that the treatment should not be employed in early or mild cases, yet he holds that this treatment should not be reserved for advanced cases only. In cases of moderate severity that have failed to obtain benefit by the usual methods of treatment, artificial pneumothorax should, in his opinion, be given a trial before the disease becomes far advanced. According to Mary E. Lapham (*Amer. Jour. Med. Sci.*, 1912, cxliii. 503) a lung that is not densely infiltrated and has no pleural adhesions is easily compressed and the results are brilliant. The dangers and difficulties increase in direct proportion to the amount of lung involved, and to the extent of the pleural adhesions. The patient may be given every opportunity to recover by the usual methods, but if after persistent efforts the temperature cannot be reduced nor extension of the disease arrested, then an attempt to aid the patient by compressing the lung seems to be amply justified. Murphy has urged that early cases of phthisis are the most suitable, for in them the most serious obstacle to complete compression of the lung, namely, extensive pleural adhesion, is not encountered. More recently, Forlanini (*Ergeb. d. in. Med. u. Kinderheilk.*, 1912, ix. 621; *Deutsch. med. Wochenschr.*, 1911, 249; *Il policlinico*, 1912, xix. 682) maintains that although excellent results can be obtained in advanced cases, the best results are achieved in early cases. The unaffected parts of a lung which have healed under compression regain their functional efficiency after decompression, and if the pleura was free of adhesions before compression, no adhesions will be found on decompression, provided care has been taken to avoid setting up a pleurisy. It is thus evident that the lung can be again compressed at some future date if necessary. When the disease affects one lung extensively and the other lung only slightly, artificial pneumothorax may still be beneficial. Forlanini expressly states that by compressing one lung, the course of the disease in the other, the comparatively sound lung, may be influenced favourably.

Several hundred cases treated by artificial pneumothorax have now been recorded in the literature. In most of them one lung was extensively diseased, in many the apex of the other lung was affected also: there was a history of years of unsuccessful attempts at recovery, together with emaciation, nocturnal sweating, and profuse purulent expectoration containing tubercle bacilli. Some of the cases did not improve under the treatment, others died while under treatment, but in many cases remarkably favourable results have been achieved. Hæmoptysis is not a contra-indication to the establishment of an artificial pneumothorax, but if there be cardiac weakness, extensive pulmonary emphysema, or tuberculosis of the larynx or intestines, it is generally admitted that the treatment should not be attempted.

The beneficial effects of pulmonary compression are as a rule proportionate to the extent of the pneumothorax. The most suitable cases for compression, therefore, are those in whom the pleural surfaces are not adherent to one another. Recent adhesions may indeed give way during the injection of nitrogen, but dense adhesions will interfere with the establishment of a total pneumothorax; and if the pleural adhesions are both extensive and dense, they render the treatment wholly inapplicable, and attempts to inject nitrogen in such cases are attended with grave danger to the patient.

Technique.—Nitrogen, as being less readily absorbed than oxygen or sterilised air, is now used in preference to either of the latter. The apparatus required for the intrapleural injection of nitrogen is extremely simple, for it consists essentially of two bottles, each having a capacity of about one litre, similar to those frequently employed to hold antiseptic lotions, rubber-tubing, a three-way stop-cock, a water manometer, and an exploratory needle. The manometer is essential, for it is only by its oscillations that we can be certain that the needle is in the pleural cavity. Forlanini's apparatus or Saugmann's modification is often used. This consists of two large cylinders, connected at their lower ends by rubber-tubing. One cylinder containing the nitrogen is connected by means of tubing with the puncture needle and a manometer to indicate the intra-pleural pressure. To the upper end of the second cylinder, which contains an antiseptic fluid, a rubber-tube with a terminal bulb is attached. The nitrogen can thus be driven out of the cylinder into the puncture needle. The latter may be introduced into the chest in the same manner as for paracentesis, and if the nitrogen is flowing from the apparatus the entrance of the needle into the pleural cavity is indicated by the gas being sucked out of the cylinder. The needle is now held in position and the nitrogen is allowed to pass into the pleural cavity. Several writers express their preference for Brauer's method—puncture of the pleura after it has been exposed by means of an incision—as being safer than Forlanini's original method. If Brauer's method is employed

on the first occasion, subsequent injections of nitrogen may be given by means of simple puncture without exposure of the pleura. The injection should be given slowly, and in every case the intra-pleural pressure should be measured by means of the manometer. The precise quantity and frequency of the injections will vary in each case. It is, however, desirable to maintain a complete collapse of the lung for at least two years, and the necessity for each further injection of nitrogen is to be judged by the extent to which the pulmonary collapse is effective. Forlanini recommends frequent, almost daily, injections of nitrogen, each not exceeding 60 to 70 c.c. Dessirier of Lyons (*Gaz. des Hôp.*, 1909, 135) prefers to give about 500 c.c. Klemperer states that if adhesions permit, he gives 750 to 1200 c.c. as the initial dose. Mary E. Lapham finds that an intra-pleural pressure of 7 to 8 cm. of water is not too much, provided that the patient is not inconvenienced thereby. If, however, the heart is weak, the pressure should be kept as low as possible, and injections given just often enough to maintain the desired degree of pulmonary compression. It is always desirable to ascertain the degree of compression by means of the Röntgen rays. The X-ray picture enables us to determine when another injection is required. The absorptive capacity of the pleura for nitrogen diminishes in the course of time, so that even if at the start the injections have to be given every few days, eventually an injection is required only every few weeks.

When the pleural surfaces are firmly and extensively adherent the technique of compression becomes much more difficult, the dangers attending the injection are greatly increased, and only a partial compression of the lung may be effected. Dumarest (*Presse méd.*, 1912, 359) points out that if there are many pleural adhesions, care must be taken not to increase the intra-pleural pressure suddenly or forcibly, so as to avoid rupturing the lung or exerting undue pressure on neighbouring organs.

Risks of Compression.—The injection of nitrogen may be accompanied by anxiety on the part of the patient, acceleration of his pulse, respiratory embarrassment and cough. If the latter symptoms be severe the injection should be discontinued for a short time and the patient given oxygen to inhale (Dumarest). More serious accidents are—(1) Subcutaneous emphysema. This may arise if the point of the needle is not in the pleural cavity, or if the intra-pleural pressure has been raised too high. In the latter instance the gas may be forced into the mediastinal tissues and embarrass the heart. (2) Cerebral embolism, from displacement of a clot in one of the pleural or pulmonary vessels by means of the increased pressure, and gas embolism are rare accidents, but serious or even fatal results have been recorded. (3) Reflex pleural disturbances, which, according to Lapham, vary from slight collapse or dyspnoea to complete aphonia and spasm of the glottis. These dis-

turbances may be avoided by the preliminary use of morphia, by applying cocaine to the pleural surface, and by not using nitrogen below the body temperature. (4) Sero-fibrinous pleurisy. This complication arose in 10 of the 23 cases reported by Fagioli (*Monatsh. med. Wochenschr.*, 1912, 1032). In his series of cases the only constant sign of the pleurisy was a sudden rise of temperature. Physical examination of the chest failed to reveal any definite sign of fluid being present, and Grocco's contralateral paravertebral dullness was not elicited, but the manometer indicated that the intra-pleural pressure had risen, and exploratory puncture demonstrated the presence of fluid. Fagioli does not regard the onset of sero-fibrinous pleurisy as an unfavourable event, because he finds that it does not interfere with the patient's ultimate recovery, but, on the contrary, the effusion is helpful in maintaining full compression of the diseased lung.

Results.—The pneumothorax should be maintained for not less than two years. During this period, it is claimed, opportunity is given for the diseased parts to become thoroughly organised and cicatrised. The ultimate functional efficiency of healthy portions of lung and of healthy pleural surfaces is not prejudiced by the treatment, no matter how long the artificial pneumothorax is maintained. After a year or more, when the lung is decompressed, the healthy alveoli and healthy pleura will resume their functions. Clinically, the results of compression are extremely satisfactory in many instances. One of the most striking results is the fall of the temperature to the normal within a few days. At first there is frequently an increase of cough and expectoration, for the compression is tending to empty the pulmonary cavities: thereafter the cough and expectoration lessen, while at the same time the tachycardia, the nocturnal sweats, and other toxic manifestations gradually disappear, and the patient begins to regain strength and health. Turning to the most recent literature we find that Molon of Venice (*Presse méd.*, 1912, 362) tried the treatment in 45 cases. In 12 compression could not be effected because of extensive pleural adhesions; in 6 cases compression aggravated the disease, and three patients succumbed: but in 26 cases excellent results were obtained. Zubiani (*ibid.*, 362) records 25 cases, the results being excellent in 14, as shown by disappearance of fever, diminution of expectoration, and improvement in general health. Sillig of Leysin (*Rec. méd. de la Suisse rom.*, 1912, xxxii., 234) records 10 cases: in 7 the treatment may be regarded as having yielded satisfactory results. In two of Sillig's cases the treatment appeared to be doing good, but could not be continued. One case died suddenly during the operation. She complained of intense headache, cried out and fell back dead. At the post-mortem examination the pleural cavity was found to be entirely obliterated by dense adhesions. Adad of Leysin (*ibid.*, 251) records an advanced case that did well after compression of the lung.

Of the four cases recorded by Persch (*Wien. klin. Wochenschr.*, 1911, xxiv, 1323) one died in 22 days, but in the other three cases admirable results were obtained. Mary E. Lapham reports 22 cases, in 18 of whom the treatment was successful. The treatment is commented on favourably by other writers in France (Billon, *Presse méd.*, 1912, 362), Germany (Cahn, *Therap. Monatshefte*, 1911, 581; Sanson, *Bech. klin. Wochenschr.*, 1911, 2293), and Hungary (Scharl, *II poliklinice*, 1912, xix, 683).

SURGERY.

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SURGERY OF BONES AND JOINTS.

IN a series of articles published in *The Journal of the American Medical Association* (6th April to 11th May), J. B. Murphy records the results of his experimental and clinical work on the surgery of bones and joints.

BONES.

In the account of the anatomy of bone he describes the periosteum as composed of three layers, the outer layer consisting mainly of rather coarse fibrous tissue, the middle fibro-elastic layer, and the inner osteogenetic layer. In bone grafting it is important to remember that the osteogenetic layer practically disappears in adult life.

Bone-Grafting.—The following axioms are enunciated:—The periosteum, fully detached from bone and transplanted into a fatty or muscular bed in the same individual, may, if he is young, produce a lasting bone deposit; if transplanted into another of the same species, it rarely does so; if into one of another species, it never does so. Periosteal strips, elevated at one end from the bone and attached at the other, if turned out into muscle or fat, regularly produce bone on their under surface for the greater part of their length. Transplanted into another of the same species, and touching exposed or freshened bone at one end, periosteum rarely produces permanent bone even near its base, and never for its full length.

Bone with its periosteum, transplanted into muscle or fat of the same individual, and free from bony contact, practically always dies and is absorbed, except in the case of very young children. Transplanted into one of another species, it is always absorbed.

Bone transplanted without its periosteum into muscle or cellular tissue always dies and is ultimately absorbed. If asepsis is attained, bone with or without periosteum transplanted in the same individual, and placed in contact with living osteogenetic bone at one or both ends,

always becomes united to the living fragments, and acts as a scaffolding for the reproduction of new bone of the same size and shape as the transplanted fragment. The new bone increases to such size as is required by Nature, and when it is surrounded by capsule it will extend even into the joint. Tuberosities are reproduced approximately in their usual situation. The transplanted fragment, large or small, is always ultimately absorbed by osteoclasts, but previously its Haversian canals, canaliculi and lacunae give mechanical support to new capillaries and blood-vessels with living osteogenetic cells, around which new bony lamellae are deposited. In short, the graft, though essential, is not osteogenetic but osteoconductive. The graft increases in girth by deposits beneath its newly-formed periosteum. The muscles should be fixed or directed to the graft in their normal relations, and the musculo-tendinous attachments should be accurately sutured to the graft with catgut or phosphor-bronze wire. Bones covered at the ends by cartilage and on the sides by periosteum, such as a phalangeal bone, even when in contact with living bone denuded of periosteum, dies and is wholly absorbed. When the graft is covered with periosteum at the point of contact with the living bone, the Haversian canals do not penetrate the fibrous layer, and regeneration fails. If the periosteum of the graft is split into shreds, regeneration through it may take place. Periosteum attached to the transplanted portion, if the graft is taken from a young individual, has a plus osteogenetic influence; in the middle-aged it is neutral; in those of advanced years it is detrimental.

The *indications* for bone transplantation are: to correct deformities, to produce union in ununited fractures, to replace bone removed by destructive infections, to restore or supplant fragments dislodged or destroyed by fractures, and to replace bone removed for innocent or encapsulated malignant tumours.

Congenital or acquired defects of the nasal bones may be remedied by attaching a fragment covered with periosteum of ulna, tibia, or fibula of the appropriate size and shape to the frontal bone or its nasal process, or to the nasal bones, the periosteum being first stripped in every case. The incision should be made on the side of the nose, and the flap raised so that the graft will be completely covered with skin, and not exposed to the air after transplantation. If air gains access to it, say from the nasal or frontal sinuses being open, it always becomes infected and necrosed, and must later be removed.

The defects of the upper and lower extremities may be supplied by a graft from the patient's tibial crest, placed in contact with living bone at one or both ends.

The possibility of osteogenesis in a transplanted epiphyseal line of young bone has not yet been demonstrated. If the entire shaft of the humerus, tibia, radius, or ulna is absent, the graft must touch the neigh-

bouring bone laterally, or at one or other extremity across the line of the joint. Subsequently an arthroplastic joint can be made.

In fractures, non-union occurs frequently, even when the approximation of the ends is perfect and the fragments are completely immobilised by plating or otherwise. In such the best method of treatment consists in transplanting a piece of the patient's tibia into the medulla, so as to span across the line of fracture. The medullary cavity of each end is reamed out to the desired size and depth, the implant is driven into one of the fragments, and secured in the other by means of a bone or iron nail. Thus a bridge is formed through which the vessels of the living bone extend. Murphy has never failed to secure union by this method. The transplant should be sufficiently strong to give mechanical support—usually as thick as an adult index or middle finger—and it need not be covered with periosteum. The graft takes from forty to sixty days to become firmly attached, and during the interval a plaster case is worn. The bone attains its normal thickness in seven to ten months. The defect in the tibia can scarcely be detected after six weeks.

In osteomyelitic infection suppuration must be entirely overcome and the wound healed before transplantation can be done. In the leg the length of the extremity may meanwhile be maintained by implanting the head of the fibula under the epiphysis of the tibia. If the femur or humerus is involved, the length must be maintained by extension till the sequestrum is freed. If the periosteum is retained, shortening may be prevented, even in the presence of infection, by the insertion of a tube or column of magnesium $\frac{1}{3}$ to $\frac{1}{2}$ inch in diameter. The involucrum forms around it, and the magnesium is, as a rule, quickly dissolved by the wound secretions, with the evolution of hydrogen gas.

When the sequestrum is removed and the wound healed, the graft, obtained from the crest of the tibia, is implanted in contact, preferably at both ends, with living bone denuded of its periosteum.

In fracture of the surgical neck of the humerus with dislocation of the head, it is often necessary to detach the head completely from its vascular supply and replace it in the glenoid cavity. It should then be nailed to the shaft, as it merely acts as a graft, being replaced by new bone with the normal contour of the head.

When bone has been removed for a neoplasm, if the periosteum has been retained the conformation of the limb and the speed of reproduction are facilitated by the implantation of a fragment of bone from the crest of the tibia. When the periosteum has been removed the implant must be in contact with living bone. It is best placed in the medullary cavity, and fixed there by means of a nail to prevent its penetration to a greater degree than is necessary. If the articular end of the bone has been removed, one end of the transplanted bone should be inserted into the capsule, and relieved from pressure by

extension. The muscles are sutured around the fragment in their normal anatomical position.

The implantation of foreign material is confined to a few situations in the body, and only a few materials can be used. When the field is sterile, magnesium plates, tubes or columns, which are eventually absorbed, may be employed. When it is impossible to obtain a sterile field, for example in operations on the mandible, non-absorbable material may be used, particularly in the face, where the circulation is so rich that the infection may be overcome, and the foreign material encapsulated without sinus formation.

For security in places where suppuration is present, small wires or cables made up of fine strands, say, of phosphor-bronze, may be inserted. They readily become encapsulated in spite of their primary infectivity.

JOINTS.

Murphy deals in turn with injuries, infections, and ankyloses of joints. He states that infections following on penetration should never, when unassociated with a fracture, be treated by free drainage, as the exposure to the air and contact with the tube destroy the endothelium, and so result in adhesions. His plan of treatment is to aspirate 10 c.cm. or more of the effusion, and inject 10 c.cm. of a 2 per cent. solution of formaldehyde in glycerine. The procedure is repeated as often as necessary at intervals of about three days. In compound lacerations the bruised tissues are dissected away, the abraded surface of bone is covered with a thin layer of Moorhof wax, and the capsule of the joint is closed with sutures. An immediate injection of 10 to 20 c.cm. of 2 per cent. formaldehyde in glycerine is then given to render the effusion antiseptic and produce a local leucocytosis and cellular infiltration on and in the synovial membrane. The ligaments and freshened margins of the skin are approximated, and a rubber-tissue drain is introduced down to, but not into, the joint. The subsequent treatment is as for penetrations, and muscular contractions are allayed by the application of extension. The same treatment is carried out in compound dislocations, the capsule, ligaments, and skin being accurately sutured, the joint injected with formaldehyde, the limb immobilised and kept in extension.

In acute and chronic arthritis tension is relieved by aspiration, the same strength of formaldehyde is injected, and luxations and other deformities during the period of inflammatory activity are prevented by the use of extension. In metastatic arthritides autogenous vaccines should also be employed. Drainage of a joint results in ankylosis in 96 per cent. of cases, and is therefore to be avoided.

Arthroplasty.—In the osseous, cartilaginous, and intra-articular ankyloses of joints, Murphy obtains movement by the operation of

arthroplasty. Peri- and extra-articular fixation may be remedied by capsulotomy, tendon elongation, or excision of exostoses. When the arteries and nerves are materially shortened by prolonged flexion, excision of part of the bone is the only operation that gives good results.

Arthroplasty depends for its success on the fact that fat-bearing connective tissue, when subjected to pressure, forms a hygroma or bursa, with surfaces lined by endothelial cells. In the case of ankylosis of the hip-joint, a U shaped incision is made with its base directed upward and the trochanter occupying the centre of the U. A flap of integuments and fascia lata is dissected up, and a Gigli saw is passed round the base of the trochanter. The trochanter is sawn off downward and outward, and retracted up with its attached muscles. The obturators and pyriformis are divided and the hip joint freely exposed. The capsule of the joint is incised, loosened from the neck of the femur, and stripped up, so that it can later be interposed if necessary, between the head of the bone and the acetabulum. In that position it will form a smooth lining for the acetabular cavity, which will not permit of the re-formation of bony union. The head is then chiselled from the ilium as near the normal anatomical line as possible, and levered out. The acetabulum is excavated by a reamer, and the head of the femur is smoothed and rounded by a cup-shaped end mill. Then comes the characteristic part of the operation. The flap of fascia lata is dissected off the reflected U and drawn over the head of the femur into the joint. The edge may be sutured to the acetabulum or to the remnant of the capsular ligament, thus forming a complete covering for the head and neck of the bone. When the head is placed in the cavity there are thus two layers of tissue between the bones, one of fascia lata and the other of capsular ligament. The latter serves mainly in preventing a locking of the joint by the formation of exostoses from the rim of the acetabulum. For good functional results, the entire articular surfaces must be covered by fascia. The leg is extended, adducted and internally rotated, when the head slips into the cavity, the trochanter is nailed in position, and the severed muscles sutured. The superficial wound is closed without drainage. The limb is dressed in the abducted position, and a weight of 20 lbs. is applied to extend it. Passive flexion is begun in seven to ten days, and lateral movements in the second or third week. In three or four weeks walking with crutches may be started.

For the knee, the most difficult joint in which to get a perfect restoration of function, two lateral flaps $2\frac{1}{2}$ ins. square are taken from the inner and outer sides of the joint, each consisting of subcutaneous fat, ligament, and capsule. The base of each flap is directed downward, and is left attached to the base of the tuberosities of the tibia. The ankylosed patella is freed, its attachments to the vastus internus and externus separated, the patella reversed so that

its anterior surface becomes its articular surface, and the muscular attachments reconstituted in suitable position. When no capsule can be differentiated, a flap of fascia lata, trochanteric bursa, and overlying fat may be wrapped round the lower end of the femur. Murphy has come to believe that such a transplanted flap from the trochanteric region forms the ideal material for arthroplasty of any joint.

For the shoulder the interposing flap may be obtained from the pectoralis major muscle, with the overlying aponeurosis and subcutaneous tissue, the pedicle being left attached to the humerus, or from the anterior portion of the deltoid.

In the elbow-joint the posterior incision is kept half an inch to the radial side of the olecranon, and, if necessary for freeing the ulnar nerve, a parallel incision is made towards the ulnar side. The interposing flaps are taken from the aponeurosis of the supinator longus, and from the fascia and fat on the inner side of the joint. The bases are directed upwards, and each flap is long enough to reach across to the opposite side of the joint.

For ankylosis between the radius and the scaphoid and semilunar bones a straight incision is made over the posterior surface of the radius, and the U-shaped flap, with the base directed upward, is taken from the deep fascia and the joint capsule.

In fixation of the mandible it is difficult to secure a local flap, and the trochanteric tissue is utilised.

As the result of arthroplasty, a new synovialoid membrane is produced with fluid contents and lining cells identical with those of hygromata. From the ends of the bone develops a fibro-cartilaginous structure. The new joints support full weight and traction, and the range of movement increases with time in uncomplicated cases till the normal limits are reached.

The wound-dressing favoured by Murphy is :—Bismuth subiodide dusting powder, covered with collodion gauze : over it a large pad of gauze moistened in carbolic lotion, 1 in 20 : over it sterilised cotton wool held in position by adhesive plaster and bandage.

OBSTETRICS AND GYNECOLOGY.

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ISTHMO-CERVICAL PREGNANCY.

DURING the last fifteen years there have been recorded from time to time cases where the ovum was attached partly to the lower uterine

segment and partly to the wall of the cervix, and a distinction has been drawn between such and ordinary cases of central placenta prævia. In all of those cases the ovum has been situated partly in the cervix and isthmus and partly in the body of the uterus. Devraigne (*L'Obstét.*, November 1911) describes a true case of isthmico-cervical pregnancy in which the ovum was situated entirely within the cervical canal and isthmus, leaving the body of the uterus completely free and empty above. The patient was a multipara, aged 35, admitted to the Tarnier Hospital, and there seen and treated by Bar. There was a history of six months' amenorrhœa, but no foetal movement had been felt, and the uterus corresponded in size to the fourth month. The os was open, and under anæsthesia the ovum could be felt attached low down within two cm. of the external os. Above it was a hard mass like a fibroid or double uterus. As the ovum was dead the foetus was removed, but the placenta was so adherent that all of it could not be got away. When the greater part had been removed the finger entered a large expanded cavity beyond the external os, and beyond it was a narrow aperture which led into the centre of the hard mass felt above. The expanded cavity from which the ovum had been removed was in the region of the cervix and isthmus. The narrower channel above was the cavity of the body of the uterus. During the puerperium the large cavity gradually contracted, and three weeks after delivery the uterus had returned to its normal shape. It was then possible definitely to exclude the presence of a double uterus. In a review of the literature Devraigne finds that the striking symptom in such cases is hæmorrhage, absent in the present one owing to the previous death of the ovum. The hæmorrhage is due to the placenta being situated on a non-contractile part of the uterus. The placenta has in all cases been densely adherent owing to the deep penetration of the villi into the cervical and isthmic tissues. The patients were all multiparæ, and the youngest was 35. The author believes that the diagnosis of a number of these cases has been missed. The conditions present closely resemble those presented by a pregnancy in a uterus with fibroid tumour, the unexpanded body of the uterus closely resembling a subperitoneal fibroid. The cases often terminate in abortion. At full time the child is usually born dead, owing to the hæmorrhage occurring during labour. The prognosis for the mother is naturally serious, and in one case it was necessary to remove the uterus in order to control the bleeding.

A CASE OF CORNUAL PREGNANCY.

A cornual pregnancy is one where the ovum develops in one of the cornua of a normal uterus. In some cases the ovum implants itself in the mucosa of the uterus in this situation, whilst in others it does so in the intramural part of the Fallopian tube. This latter is really an interstitial tubal pregnancy, but the ovum tends to develop towards the

uterine cavity. In most cases a distinct diaphragm of tissue separates the foetal sac from the general uterine cavity. An ovum in such a situation produces an irregular enlargement of the uterus. The case may go to term and the patient be delivered naturally. Rupture may occur in the early months either into the uterine cavity or through the wall of the uterus into the peritoneum with all the symptoms of a ruptured tubal pregnancy. Schumann (*Amer. Journ. of Obstet.*, April 1912) describes a typical case. The patient was a multipara, aged 34. She was first seen when four months pregnant, and sought advice because of severe abdominal pain. She presented the ordinary symptoms and signs of pregnancy, but the uterus was abnormally enlarged towards the right side of the fundus. The pain became so severe that operation had to be undertaken. She was prepared for abdominal section if necessary, and the cervical canal was dilated. The uterus was large and flaccid, and, with the finger inside, a large dense mass was felt occupying the right cornual region and bulging into the cavity. In the centre of the septum which separated the cornual mass from the uterine cavity was a small aperture through which the foetal sac could be felt. The ovum was removed from the thinned-out uterine horn. The placenta was much flattened and had at one side a finger-like prolongation, which had been attached for a considerable distance along the lateral aspect of the tube. The uterine cavity was lined by a complete decidua. The wall of the sac in which the ovum was lying was very attenuated and felt as if on the point of rupture. Owing to this thinning of the sac the operator must always be prepared when dealing with the condition from the vagina to open the abdomen should occasion arise.

TREATMENT OF ACUTE PUERPERAL INVERSION OF THE UTERUS.

Phillips (*Journ. of Obstet. and Gynec. of Brit. Emp.*, March 1912) considers that the treatment of this complication advised by the ordinary obstetric text-books should be revised. They urge immediate replacing of the inverted uterus in all cases. In Phillips' opinion the displacement should be ignored until the shock which is so frequently present has been treated. The three symptoms present in such cases are hæmorrhage, pain, and shock. The latter is produced during the actual process of inversion, is always well marked immediately after the accident, but if the patient survive, gradually disappears. The process of reinversion also causes shock, even if the patient be anaesthetised. In an analysis of 184 cases Phillips finds a mortality of 23·4 per cent. In 79 of these, where the uterus was immediately replaced in the presence of marked shock, the mortality was 30 per cent. In 47 cases where the uterus was not reduced at once only two patients died—less than 5 per cent. He holds that where there is marked shock this ought first of all to be treated by saline infusions, hypodermic injections

of morphia and pituitary extract, and the application of hot blankets. After some hours the patient should be anaesthetised and replacement effected. After this a second saline infusion and stimulants may be necessary. He describes three cases in which he followed out this line of treatment with successful results. In one of the cases he postponed replacement till the next day, and found no difficulty on account of the delay. The delay of a few hours does not appear to increase the difficulty materially. Whether shock be present or not an anæsthetic should be given.

SEVERE INTRA-PERITONEAL HÆMORRHAGE FROM RUPTURE OF A NORMAL GRAAFIAN FOLLICLE.

In the majority of cases of intra-peritoneal hæmorrhage in women the source of bleeding is a ruptured tubal pregnancy. There are, however, other possible sites. Jayle recorded, in 1909, 17 cases where the bleeding resulted from the rupture of a hæmorrhagic cyst of the ovary. The following year Bazy made observations on intra-peritoneal hæmorrhage occurring from the non-gravid tube. Regurgitation of menstrual blood from the uterus through the tube is also possible. Cranwell (*Ann. de gynec. et d'obstet.*, April 1912) records a case of severe intra-peritoneal hæmorrhage from the rupture of a normal Graafian follicle. Only two other such cases are to be found in the literature. The patient in this case was a parous woman aged 24, previously perfectly healthy. She was seized with acute abdominal pain, which was at first intermittent but later became continuous. This pain lasted for several days. When admitted to hospital the patient was pale, was frequently sick, and was covered with a cold sweat. The abdomen was distended, and she presented the typical appearances associated with an intra-peritoneal hæmorrhage. The abdomen was immediately opened. The cavity was full of fluid blood and blood-clot. The left ovary, slightly increased in size, had on its surface a minute orifice from which the blood was flowing. The ovary, together with the tube, was removed. The other ovary was slightly cystic. The patient made a good recovery. On microscopic examination the ovary showed nothing abnormal, except a rupture in the wall of a recent follicle. From the size of the lutein layer surrounding this, and from the characters of the lutein cells, ovulation had occurred two or three days previously. This case, together with the other two recorded, is of interest as showing that extensive bleeding may result from what ought to be a physiological process. Minor degrees of such bleeding probably occur more frequently than is generally supposed. It is not uncommon to find traces of blood in the pouch of Douglas when the abdomen is opened in the course of gynecological operations. This blood probably results from the rupture of a Graafian follicle.

ACUTE DILATATION OF THE STOMACH IN THE PUERPERIUM.

Acute gastric dilatation is a complication not infrequently met with after abdominal operations. It causes a great deal of distress to the patient, and if not relieved may terminate fatally. Audebert (*Ann. de gynec. et d'obstet.*, February 1912) calls attention to the same condition occurring after childbirth. He has observed 4 cases, and other cases have recently been recorded. The usual symptoms are constant vomiting of brownish-green fluid, great thirst, swelling of the epigastrium, and general meteorism: splashing in the gastric region can usually be elicited; the expression becomes anxious: the pulse is feeble and rapid, and there is a tendency to collapse. The bowels are constipated. The time of onset varies. The vomiting may begin immediately after delivery or may be delayed for some hours or even for three or four days. In eight of the cases recorded the patients had had chloroform, and at first the vomiting looked like ordinary chloroform sickness. In a number the labour had been delayed, and obstetric interference was required. Two were suffering from eclampsia. In one of Audebert's cases, however, the labour was perfectly normal and no chloroform had been administered. In treating such cases the best results are obtained by making the patient lie on her face. When this is done, vomiting almost immediately ceases and the general condition rapidly improves. A pillow ought to be placed underneath the abdomen. In some it may be necessary to wash out the stomach. The best prophylactic treatment is thorough evacuation of the bowels before delivery. We have ourselves seen a case of this kind where the vomiting was very excessive, with dilatation of the stomach, weak rapid pulse, and slight jaundice, and we ascribed the condition to an overdose of chloroform during labour. Gastric lavage and saline infusions cured the condition.

DECIDUA FORMATION IN THE OMENTUM IN SECONDARY ABDOMINAL PREGNANCY.

The so-called decidual reaction consists in the transformation of connective-tissue cells into large polygonal cells with large round faintly-staining nuclei. These cells lie close together, forming a dense tissue. Such a reaction can only occur in a soft tissue which is capable of expansion, such as the endometrium. Considering the frequency with which in secondary abdominal pregnancy the ovum becomes attached to the omentum, the number of cases where decidual reaction has been described in it are few. Outerbridge (*Amer. Journ. of Obstet.*, February 1912) in a search through the literature has found only seven cases. In his own case the tubal pregnancy had become secondarily abdominal and the placenta had developed partly in connection with the omentum. The placenta presented the ordinary microscopic appearances. Next to the trophoblastic layer was a tissue composed

chiefly of loose fibres and fat and containing engorged blood-vessels, evidently omentum. Scattered throughout the fatty tissue were clearly-defined groups of characteristic decidual cells. These were round or polygonal in shape, many times larger than the stroma cells of the surrounding tissue, and were arranged in a tessellated manner, almost like a squamous epithelium. Between these larger cells were smaller ones like ordinary connective-tissue cells. The appearances were those of a typical decida. The decidual cells had evidently arisen from the stroma cells of the omentum, as transition forms could be distinguished. Sections of the tube showed an interstitial salpingitis but no decidual reaction. In the ovary, however, there were masses of decidual cells grouped round the periphery.

DISEASES OF THE EAR.

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OTITIC CEREBRAL ABSCESS.

CEREBRAL abscesses due to infection from the middle ear are situated in the temporo-sphenoidal lobe ; they are said to be twice as common as cerebellar abscesses. They usually occur in the second and third decades, are more frequent in the male sex, and are more common on the right than on the left side.

Etiology.—The most usual cause of temporo-sphenoidal abscess is an acute exacerbation of a chronic middle ear suppuration, especially of those cases complicated by cholesteatoma. Cerebral abscess rarely follows acute suppurative otitis media except in bad cases of measles, scarlet fever, or influenza : such a complication is favoured if a dehiscence be present in the roof of the middle ear cleft between the squamous and petro-mastoid portions of the temporal bone, or if air cells in connection with the mastoid antrum extend into the posterior root of the zygoma. Chronic suppuration gives rise to four cerebral abscesses for every one due to acute otitis.

Bacteriology.—In acute cases the organism is usually a streptococcus in pure culture or combined with diplococci. In chronic cases, in addition to streptococci and staphylococci, the *B. proteus*, *B. coli*, *B. pyocyaneus* or diphtheroids may be present. If anaerobic organisms be found the prognosis is bad.

Pathology.—There are two forms of abscess—(1) *superficial*, and

(2) *deep*. (1) The superficial abscess develops quietly by direct extension of the inflammatory process from the middle ear. The dura mater covering the roof of the tympanic cavity or antrum is first affected, and a pachymeningitis interna is set up, which spreads to the pia-arachnoid and superficial brain tissue. (2) In the deep abscess, on the other hand, *apparently* healthy brain tissue intervenes between the dura and the abscess cavity. An *extra-dural* abscess is first formed, and then one or more of the veins passing from the brain substance to the dura becomes infected; thrombosis follows, and a deep abscess is the result. It is also said that infection may pass along the lymphatic channels. This deep abscess is situated in the white matter, and may thus press on, or otherwise affect, the tracts passing from the motor cortex through the internal capsule. The dura mater in the roof of the middle ear in cases of cerebral abscess is never quite normal: it may show a small fistula, a necrotic patch, or merely a change of colour.

Brain abscesses may be (a) *encapsulated*, or (b) *non-encapsulated*. (a) The first variety is caused by capsulated organisms such as the *pneumococcus* or the *streptococcus mucosus*, which give rise to fibrin formation and thus produce a lining membrane. These abscesses have no pockets. (b) *Non-capsulated* abscesses are usually due to putrefactive and anaerobic organisms; the walls of the cavity, which may have pockets, are formed of ragged necrotic brain tissue surrounded by a zone of encephalitis or inflammatory oedema. The non-capsulated group give rise to more marked symptoms and are much more dangerous, because the inflammatory oedema is very liable to spread and cause death from sudden increase in intracranial pressure. It will thus be seen that bacteriological examination of the pus from a brain abscess is very important, *e.g.* if a patient have a rise of temperature 48 hours after operation on a cerebral abscess, and if the organism present was found to be the *B. proteus*, the wound cavity should be searched for pockets, whereas if, in similar circumstances, the organism was the *pneumococcus*, the trouble would probably be due to faulty drainage.

The *symptoms* may be divided into three groups:—I. *General Toxic Symptoms*.—In cases due to venous thrombosis there may be a slight rigor accompanied by fever at an early stage. The tongue is furred, appetite usually lost (though sometimes voracious), and the bowels are constipated. The patient sleeps badly, and his friends may notice that his character has altered. II. *Symptoms Due to Increased Intracranial Pressure*.—Headache, slow pulse, subnormal temperature, vomiting, and optic oedema. III. *Focal Symptoms*.—Local headache and tenderness on percussion; local swelling of the scalp; various forms of aphasia if abscess be on the left side; paresis or paralysis of the contralateral side; rarely loss of smell, or of hearing in opposite ear. If the abscess extends into the occipital lobe the patient may have homonymous hemiopia.

The four stages of cerebral abscess merge into one another.

(a) *Initial*.—This stage only lasts a day or two. In the case of a superficial abscess the symptoms (if any) are overshadowed by those of the pachymeningitis. In the deep abscess on the other hand there is usually a slight rigor corresponding to the period of thrombosis of the cerebral vein. As a rule there is slight elevation of temperature, and, even at this stage, deep abscesses may give rise to pressure symptoms.

(b) *Latent Stage*.—The patient is lazy and drowsy and may drop off to sleep while being questioned. He suffers from headache, which is increased by anything which raises the blood-pressure, *e.g.* tea, coffee, alcohol, stooping, or mental effort. Cerebration is slow and the patient sleeps badly. The tongue is furred, the breath foul, the appetite as a rule poor, and the bowels constipated. The patient is obviously ill and his complexion is sallow. It is noteworthy that in the presence of an intracranial complication the leucocyte count and especially the polymorphs remain raised in spite of a mastoid operation: further, the operation cavity never heals if intracranial trouble be present. If the eyes be examined, early changes may sometimes be noted in the discs. The patient's temperature is irregular but the excursions are not large. There may be pain localised to the temporal region and tenderness on percussion; the note elicited may be higher on the affected side. The patient holds his head stiffly and walks carefully to avoid jolting. During sleep he may be observed to claw uneasily at the affected side of his head. If the diagnosis can be made at this stage the prognosis is much better than if operation be delayed until the manifest period: if, however, the mastoid operation alone be performed during the latent stage, the case at once passes on to (c).

(c) *Manifest Stage*.—The headache increases as the abscess grows: it comes on in attacks and is more generalised. The temperature is subnormal and the pulse slow (40 to 60). Although the sight is not affected until the late stages, the increase in the intracranial pressure causes the edges of the optic disc to become blurred and the veins to be abnormally full and tortuous. This condition is usually bilateral and generally worse on the affected side. Vomiting is of the cerebral type, *i.e.* effortless and unrelated to the taking of food. If the deep abscess be on the left side it is usually situated between the centres for visual and auditory memory, so that, although the patient can recognise simple objects, such as a knife or a pen, he cannot name them; he may, however, say they are "for cutting" or "for writing with." Again, he may recognise the object but give it a wrong name, or he may be able to name the object only when he handles it. Occasionally the phenomenon known as *perseveration* is present, *i.e.* if the patient be asked what day it is he may answer correctly (or otherwise) "Monday," but, if questioned further, he merely keeps on repeating the word "Monday." If the abscess be situated in the white matter

of the temporo-sphenoidal lobe it will in time press on the internal capsule and so produce paresis or paralysis of the opposite side along with increase in the reflexes: as the lesion is supra-nuclear the muscles of the forehead are not affected. The third nerve, especially the fibres to the iris and levator palpebrae, may be affected: at first the pupil is contracted, but later on it becomes dilated, and there is drooping of the upper eyelid. If the abscess invade the occipital lobe homonymous hemianopsia may be present. Rare cases are recorded in which the sense of smell is interfered with owing to involvement of the hippocampal convolution, while in others the hearing of the opposite ear may be affected owing to disease of the cortical hearing centre on the affected side. Hearing tests in a case of cerebral abscess show middle ear deafness on the diseased side, whereas in cerebellar cases the inner ear is frequently the seat of labyrinthitis.

(d) *Terminal*.—The patient gradually passes into a comatose condition: epileptic attacks have been recorded. A sudden attack of coma along with high temperature would indicate rupture of the abscess into the lateral ventricle.

Prognosis.—About 50 per cent. of cases are accompanied by another intracranial complication and are therefore unfavourable. From carefully compiled statistics it appears that only 30 per cent. of cases are cured by operation.

Treatment.—If there is any suspicion of brain abscess lumbar puncture should *not* be carried out before operation. The abscess itself is best approached along the route of infection, *i.e.* by removal of the roof of the middle ear cleft from the mastoid wound and exposure of an area of dura the size of half a crown: this should be done with the hammer and chisel. A crucial incision is now made in the dura and the brain explored with Preysing's knife or Horsley's pus seeker; the instrument must not penetrate more than $1\frac{1}{4}$ ins. for fear of injury to the lateral ventricle. After the pus has been evacuated the cavity should not be washed out: it may be drained by one of three methods—(1) packing with a long strip of selvedge gauze through the encephaloscope; (2) by means of single or double drainage tubing; (3) by a cigarette drain. Whatever method be adopted, drainage should not be discontinued too early, and must at any rate be kept up as long as the discharge remains purulent. If the abscess be large a counter-opening in the temporal region is advisable. Prolapse of the brain is often very troublesome, and is due to increased intracranial pressure caused by encephalitis or meningitis; it is best obviated by free removal of bone and good drainage. The prolapse should not be cut off unless it interferes with drainage. Brain abscesses heal badly owing to the arrangement of the cerebral blood-vessels (end arteries), and also because of the poor capacity of the neuroglia to form scar tissue.

The writers are indebted for most of the facts contained in this review to the lectures of Privat-dozenten Dr. H. Neumann and Dr. E. Ruttin of Vienna. *Die otitischen Erkrankungen des Hirns, der Hirnhäute, und der Blutleiter* by Dr. Otto Körner of Rostock, has also been consulted.

MEDICAL JURISPRUDENCE.

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METHYLATED SPIRIT POISONING.

THE poisonous properties of methyl alcohol have recently been brought into prominence through fatalities on a large scale in Berlin, where last Christmastide some 173 inmates of the large refuge for the destitute became ill from drinking "schnaps" containing a large proportion of methyl alcohol, with 72 fatal cases. Poisoning by methyl alcohol, although of fairly common occurrence in Hungary, Russia, and America, was, up till this time, scarcely known in Germany, and the cause of the sudden outbreak of illness was at first not recognised. Botulismus from tainted red herring was at first suspected, and this idea gained some support from the fact that the stomach contents from one of the fatal cases proved fatal to animals, but it was soon observed that cases were occurring amongst men who had taken no fish, and also that there were no cases amongst the female inmates, who were practically all free consumers of this particular article of diet. The symptoms were rather variable, and Stadelmann (*Berl. klin. Wochenschr.*, No. 5, 1912), who saw a great many of the cases, divides them into three groups—(1) The most severe cases commenced with nausea, and occasionally vomiting; later, generally after 24 to 36 hours, they became suddenly ill with cyanosis, deep forced breathing, air-hunger, and extreme dyspnoea similar to that of diabetic coma, twitchings and convulsions, tonic and clonic spasms in the limbs (but not in the face), and pains in various parts of the body, especially in the epigastrium. The pulse was at first good; later it became rapid and feeble. The eyes presented the most characteristic symptoms, the pupils being widely dilated, and with no reaction to light although still reacting slightly for accommodation. There was no paralysis of the eye muscles. The patients complained of things swimming before their eyes, and of dimness of vision, going on to complete blindness. Death usually occurred suddenly from

respiratory paralysis. (2) In the second class the symptoms were similar but less severe, but at any moment they were liable to become suddenly worse and pass into the first class. Eye symptoms were constantly present: if dyspnoea were superadded, the case assumed a graver aspect. (3) The mildest cases usually showed some of the general symptoms mentioned above, and invariably eye symptoms. The patients were dazed and suffering from more or less amnesia, but had not the appearance of suffering from ordinary drunkenness, and they had no smell of alcohol. Diarrhoea was seldom observed, but frequently severe constipation, which even large doses of calomel failed to relieve, was present. The absence of any paralyses should be noted as an important point in distinguishing these cases from food-poisoning. A prognosis cannot be given with any degree of surety in any particular case, because apparently very severe cases recover, whilst slight cases may at any moment assume a grave aspect. With regard to the eyesight of those who recover, two points may be noted—(1) if the pupils remain dilated there is always the possibility of a relapse with return of symptoms within the first week or so, with a very unfavourable outlook: and (2) the eyesight may be badly impaired, or there may be complete blindness from optic neuritis and atrophy. The blindness may not come on till 4 or 5 days after drinking, and some months must elapse before the permanent result as regards vision can be definitely ascertained.

The treatment adopted in Berlin was at first washing out of the stomach, but this was soon given up because it caused so much discomfort and was of no use, the poison having been taken so long before that none was left in the stomach. Warmth externally and internally and stimulants of various kinds were employed: one point noted was the aversion of all the patients to alcoholic beverages. The best results seemed to be obtained by the use of morphia, given in fairly large doses.

The post-mortem appearances as reported by Bürger are in no way characteristic, and it is not possible to make a diagnosis of death from methyl alcohol poisoning from these alone. Methyl alcohol, however, circulates as such in the body for some considerable time, and it can be recovered from the organs and recognised chemically as late as three days after ingestion, whilst its characteristic oxidation products, formaldehyde and, more especially, formic acid, may be obtained in the urine almost invariably as late as the fourth or fifth day.

The fatal drink in the Berlin fatality proved to be a mixture of approximately two-thirds methyl alcohol and one-third ordinary spirit diluted to a certain extent with water. Speaking generally of poisoning by methyl alcohol, there is still considerable uncertainty as to whether the alcohol itself, impurities in it, or its oxidation products, are the active toxic agent; or whether there is not some peculiar effect due to its mixture with ethyl alcohol or some other substance, *e.g.* in the

case of methylated spirits, to the drinking of which, and not of pure methyl alcohol, most fatalities are due. The latency of the symptoms is a peculiar feature, unlike that of poisoning by any other organic compound of low molecular weight. Another peculiarity is the extraordinary variability in the results produced both in man and in experimental animals. Fifteen grammes of wood spirit (impure methyl alcohol), although not sufficient to make a man drunk, have been known to produce the severest symptoms, whilst, on the other hand, enormously greater doses have been taken almost with impunity. The same quantities of methylated spirit taken by two different individuals under identical circumstances will often produce very different results. A cumulative action is sometimes observed; no ill effect following from a single dose, but from several small doses spread over some days disastrous results may ensue. This cannot be due to delayed absorption, because methyl alcohol is quickly absorbed, and, moreover, a similar delay in the onset of symptoms has been noted in animals where the alcohol has been administered intravenously.

Pure methyl alcohol is indistinguishable from ethyl alcohol by taste or smell, and it is not infrequently employed to render drinks more fiery and attractive to a certain class of customers. Denaturised spirit is employed for the same purpose, although in this country the free sale of "industrial" alcohol, which is denaturised without the addition of naphtha to render it unpotable, is not allowed. This industrial spirit, which contains 10 per cent. of methyl alcohol, is used in large quantities in the manufacture of varnishes, oil-cloths, hair-washes, liniments, etc., and would, if taken intentionally or by mistake, easily give rise to symptoms of methyl alcohol poisoning. It has also been stated, although not on very certain grounds, that the vapour of methyl alcohol, if inhaled for long, will give rise to similar bad effects. Wood spirit or crude methyl alcohol has given rise to numerous fatalities and cases of blindness, especially in America. Poisoning has also followed from the drinking of bay rum, essences of peppermint and ginger falsified with methyl alcohol, and the liquid employed in patent light-strikers, although petrol is now more commonly used in these than methyl alcohol. Lastly, of course, ordinary commercial methylated spirit produces similar results, but the presence of other additional denaturising agents renders this unpotable to most persons. The following are additional recent papers on this subject:—Pinkus, *Med. Klinik*, No. 1, 1912; Foerster, *Mönc. med. Wochenschr.*, No. 5, 1912; Nesemann, *Ztschr. f. Medizinalbeamte*, No. 2, 1912; Bürger, *ibid.*; Kuhn, *ibid.*, No. 7, 1912; Kejerstein, *ibid.*; Schenk, *Deutsch. med. Ztg.*, No. 6, 1912.

MECONIUM STAINS.

In a long article on the examination of meconium stains, which may be necessary in dealing with cases of concealment of birth, infanticide,

etc., Dervieux and Leclercq (*Ann. d'hyg. pub. et de m d. L g.*, March 1912) discuss in how far the following questions can be answered from the examination:—(1) Is the stain due to human meconium? A little of the stain or a small piece of the cloth on which it is present is macerated in a drop of distilled water, gently broken up with a needle, and examined microscopically. To prove the presence of meconium it is essential to find cholesterin crystals and meconium corpuscles, rounded bodies, 5 μ . to 40 μ . in diameter, greenish or yellowish-brown in colour, and paler at the periphery than in the finely granular centre. On running a little impure nitric acid under the cover-glass these corpuscles take on a pale violet colour. If necessary the human origin of the meconium may be tested by the precipitin method, a filtered solution of the stain in normal saline solution being tested in various dilutions against the serum of a rabbit prepared with human meconium, the necessary controls being made against normal rabbit serum, the saline solution used to dissolve the stain, and the cloth, etc., on which the stain was found. The test cannot be made if the meconium stain is mixed with blood or human faeces. (2) Was the child from which the meconium came viable? This can only be answered approximately. Meconium from a f tus between the fifth and eighth months contains cholesterin, but usually no hairs or epidermal cells. After the eighth month these latter elements are swallowed with amniotic fluid, and can usually be found abundantly in the meconium. (3) Had the child lived or not? This question cannot be answered unless the child has lived several days and has taken milk, when the stools no longer present the characters of meconium. (4) How old are the stains? If the stains are still moist they are probably not more than three days old, but the rate of drying must obviously vary considerably. If the stains are dry no approximation even is possible.

SMOKELESS POWDERS AND "NEAR DISCHARGE" WOUNDS.

Fraenkel (*V rth rschr. f. gericht. Med.*, 1912, 2nd Suppl.) records the appearances produced by the near discharge of a Browning pistol of 7.65 mm. calibre, which, although doubtlessly only true for this particular weapon, are of interest in comparison with the effects caused by old-fashioned weapons with black powder. He defines a near discharge wound as one in which powder is recognisable in addition to the effects of the bullet. On the skin of the temple, with the muzzle touching or within $\frac{1}{2}$ cm., an irregular wound up to 4 cm. diameter is produced: at 1 cm. and beyond the entrance wound is not larger than the bullet. On the arms or legs, with the muzzle within $\frac{1}{2}$ cm., the wound is jagged but not more than 1 cm. in diameter: from distances beyond 1 cm. it shows no irregularities. The skull shows a hole about 4.5 cm. across at the entrance wound when the muzzle is held touching the skin: $\frac{1}{2}$ cm. off and at any distance up to 50 cm. there is only a clean hole

the size of the bullet, with cracks radiating out from it for considerable distances. The exit wound at all distances is about 0.8 cm. across in the inner table, 1 cm. or rather more on the outer table, and also with a series of fractures radiating from the hole.

There is no burning or singeing of the skin, although a bright flame can be seen coming from the pistol.

With shots fired at distances up to about 7 cm. there is a ring of greyish smoke on the skin round the entrance wound: the radius of this ring is approximately equal to the distance of the muzzle from the skin. At 15 cm. and beyond the smoke ring is completely absent. This grey smoke is less easily washed off than the black smoke ring of ordinary gunpowder.

Around the opening of the entrance wound there is a ring of dried parchment-like skin with shots fired at distances between about 1 cm. and 6 cm. This is due to the driving into the horny layer of the skin of hot partially consumed powder particles. At distances a little over 6 cm. there may be specks of dried skin round individual particles, but no continuous ring.

The particles driven into the skin consist of charcoal, unaltered grains of powder, and partially consumed grains of powder. With shots fired touching the skin, or closer than 1 cm., these particles are to be found only inside the wound, and may be carried along its track even as far as the exit wound. With shots fired between 1 cm. and 25 cm. they form a ring round the wound, the diameter of the ring and the density of the particles within it depending upon the distance. Beyond 25 cm. they are not found *in* the skin although some may be lying *on* it at distances up to 50 cm.

Unconsumed or partially consumed particles of smokeless powders can be identified as such by the nitro-reaction—a blue colour with diphenylamine and concentrated sulphuric acid.

NEW BOOKS.

The New Physiology in Surgical and General Practice. By A. RENDLE SHORT, M.D., B.S., B.Sc., F.R.C.S. Pp. 201. Bristol: John Wright & Sons, Ltd. 1911. Price 4s. 6d.

WE welcome this little volume as a harbinger of other and more complete works on surgical physiology. There is a singular dearth of books on the subject, and this is reflected in the ignorance of many clinicians regarding even the elementary physiological principles. We are pleased to recognise that this book, though one of the first of its kind, runs along the right lines. If we have any fault to find, it is that it is over-speculative. Speculation is admittedly necessary in the early stages of the application of experimental findings to clinical conditions, but it should be confined to the less important rather than to the fundamental principles. To take an example, much of the chapter on

the thyroid gland is built up on the supposition that the active principle of the thyroid secretion is iodothylin, but this has not yet been established. The section dealing with the digestion and absorption of food stuffs contains much useful information succinctly expressed, and furnishes an excellent summary of the work of Pawlow and others. In dealing with surgical shock the author rightly draws attention to the fact pointed out by Sherrington that the increased concentration of the blood is an important factor. The discussion of cerebral localisation again leads into debatable territory, but an interesting chapter is given. Other sections deal with the pituitary gland, the hæmorrhagic diathesis, the physiology of uric acid and other urinary deposits, acidosis, chloroform poisoning, nerve injuries, the spinal cord, and cutaneous anesthetics. In an appendix are tabulated urinary analyses in patients fed by nutrient enemata, from which it is concluded that this method of feeding is practically useless. We can confidently recommend the book to all engaged in medical and surgical practice.

The Sensibility of the Alimentary Canal. By ARTHUR F. HERTZ, M.A., M.D., F.R.C.P. Pp. 83. London: Henry Frowde and Hodder & Stoughton. 1911. Price 5s.

IN this volume are reprinted the Goulstonian lectures, with a few minor additions. They give the results of extended observations on a series of normal and abnormal individuals, and form a brilliant chapter of clinical physiology. In some instances the findings are at variance with everyday teaching, and in others they are not in agreement with Mackenzie's well-known views. It is in the consideration of these differences that the chief interest of the book lies. Hertz finds that the mucous membrane of the œsophagus is sensitive to thermal, not to tactile or chemical (weak acid), stimuli. The intact mucous membrane of the stomach and the intestine down to the lower end of the rectum, and the surface of gastric and duodenal ulcers are insensitive to similar thermal, tactile, and chemical stimuli. The sensation of fulness in the alimentary canal is ascribed to a slow increase in the tension exerted on the fibres of the muscular coat, and fulness in the rectum produces the call to defæcation. This call may also be excited from the anal canal, as after the introduction of a glycerine suppository. Mackenzie states that visceral pain as such does not exist, but Hertz holds that, while referred pain sometimes exists, pain in diseases of the alimentary canal is most frequently true visceral pain, due to a more rapid or greater increase in tension on the muscular fibres than is sufficient to cause fulness. Pain may also be produced by dragging on the peritoneal connections. Tenderness is not only due to hyperælgæsia of the abdominal wall, but may also be true visceral tenderness. The publication of this book is bound to stimulate controversy, and so advance our knowledge of the physiology and pathology of the alimentary canal.

BOOKS RECEIVED.

- APPEL, E. I. C. How to Become a Certified Midwife. New Edition, revised by C. E. M. Bennett (*Scientific Press, Ltd.*) 6d.
- BADER-ALMANACH. English Edition, 1912. (*R. Moss, Berlin*)
- BALLANCE, C. A. Cerebral Decompression in Ordinary Practice (*Macmillan & Co.*) 2s. 6d.
- BARBER, H. V. The Tuberculin Treatment of Consumption (*Nisbet & Co.*) 6d.
- BEARD, JOSEPH. Annual Report upon the Work of Medical Inspection of the City of Carlisle for Year 1911 —
- BEARD, JOSEPH. Report on the Sanitary Condition of the City of Carlisle for the Year 1911 —
- BLEULER, E. Translated by W. A. White. The Theory of Schizophrenic Negativism (*Journal of Nervous and Mental Disease*, 1912)
- BROCKBANK, E. M. Children: Their Care and Management (*Frowde, Hodder & Stoughton*) 3s. 6d.
- BROOKS, LUCY. Physiology made Easy (*Scientific Press, Ltd.*) 1s. 6d.
- BRUCE, J. M., and W. J. DILLING. Materia Medica and Therapeutics. Ninth Edition (*Cassell & Co.*) 6s. 6d.
- BURROWS, HAROLD. Surgical Instruments and Appliances. Fourth Edition (*Scientific Press, Ltd.*) 1s. 6d.
- BURY, JUDSON S. Diseases of the Nervous System (*Sherratt & Hughes*) 15s.
- CATHCART, E. P. The Physiology of Protein Metabolism (*Longmans, Green & Co.*) 4s. 6d.
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EDINBURGH MEDICAL JOURNAL.

EDITORIAL NOTES.

The Decision of the Representative Meeting. THAT a body of private citizens should decide, by a majority of nine to one, to break off negotiations with the Government of their country is unexampled in recent history. That a profession which has been, of all others, least organised in its own defence, which has pressed on every law calculated to improve the health of the community, should be driven to so momentous a step by the most comprehensive piece of public health legislation ever contemplated is, in itself, a fact which should give the hasty critic pause. Serious as is the action of the British Medical Association, we believe that it is right, that it is justifiable by what has passed, and that it will be more than vindicated in the future.

This is neither the time nor the place to review the history of the "negotiations"—dilatory in their beginning, vexatious in their progress, barren in their results. The Chancellor of the Exchequer gave them their deathblow in his speech at Kennington, and the Association has merely signed their death certificate. Let them be decently buried: we have to turn to the work which lies ahead of us.

It has been officially announced that the Government will accept as final the decision of the Association, and we may assume that no further overtures will be made. We have to face, then, an attempt to create a medical civil service, or, alternatively, suspension of the medical benefits. The latter obviously will be the *dernier ressort*. To meet the first contingency, organisation of the profession is necessary: to meet the second, a constructive policy.

Six months are before us, untrammelled by the futilities of deputations and advisory committees, in which to accomplish these objects. At the root of efficient organisation lies the fostering of such spirit of loyalty to their fellows as will prevent men, through a sense of honour, from accepting appointments vacated by their brethren, or created by the Insurance Commissioners to supplant them. In this work every doctor by word and example can take part. A constructive policy, whether in the nature of planning a public medical service or otherwise, will require careful deliberation by our representatives. It is highly improbable that any scheme can be devised elastic enough to suit the whole country, so much do local conditions vary. Every provisional medical committee, therefore, ought to take this matter up and ask itself, fairly and squarely, how it proposes to meet January 1913, when contract practice as we know it ceases, and when we are faced by

large and powerful friendly societies requiring and demanding medical attendance. It is enough to state the problem; difficult as it seems, we do not doubt that there will be arrived at a solution which will at once meet the just claims of the profession and ensure a more efficient attendance on the workers than in the past. Only a solution satisfying both these conditions can have any element of permanence, and it now devolves upon the medical profession to show that it can finally solve a problem which has baffled the wit of Mr. Lloyd George.

**Voluntary Hospitals
and the Insurance Act.**

IN our last issue we referred to certain difficulties with which members of the honorary staffs of voluntary hospitals were faced in view of the possible exploitation of the hospitals by persons insured under the National Insurance Act. Since we wrote the Staff of the Royal Infirmary have approached the managers, and have laid before them views similar to those we expressed last month.

It is highly gratifying to record that the Managers have met the Staff in the most friendly manner, and, after granting them a conference and considering the memorandum submitted, have replied through their treasurer and clerk in the following terms:—

“I am now directed to say that the Board sympathises with the Staff in the difficult position in which they are placed at the present time, but is confident that the Staff, while maintaining the fullest loyalty to their professional brethren, will always keep in view the true interests of the sick poor for whom this great charity exists and is supported.

“I am also further directed to say that the Board, after discussion, arrived at the following conclusions:—

“1. That in present circumstances insured persons being entitled to medical benefits under the Insurance Act should not be treated in the out-patient departments of the hospital except in accident cases, urgent cases, and suitable consultation cases;

“2. That the Honorary Staff shall be entitled to exercise the option (recognised in private practice) to decline to meet any practitioner in consultation should such a course be considered advisable, but always provided that no patient shall be denied immediate advice or treatment if that be requisite on medical grounds;

“3. That the question of investigating the circumstances of applicants for the benefits of the hospital by means of almoners or otherwise is one which will require time and care in consideration, owing to its undoubted complexity. The Managers will, however, give the subject their most careful attention in due course.”

We feel certain that the Honorary Staff and the profession as a whole will fully appreciate the sympathetic and broad-minded view of the situation taken by the Board, and that the Staff will in no way strain the confidence which the Managers have placed in them.

**Sir William Plender's
Report.**

AN entirely unwarrantable deduction is apparently drawn by the Chancellor of the Exchequer from Sir William Plender's figures. In his speech on the "Joy Day" celebrations Mr. Lloyd George uses these figures to prove that the 6s. grant of the Government is a liberal offer. Assume that the figures accurately represent practice in the selected towns; admit, even, that the selected towns are fair samples of the class of practice for which the Act provides: grant both these arguable premises in order to avoid side issues, there yet exists a very obvious fallacy which cannot be too clearly pointed out.

Four shillings and twopence per head of the population is, according to Sir William Plender's report, the average annual gross income derived from visits at patients' houses and attendances at surgeries after deducting therefrom the number of persons attended under contract. That is to say, it is the average sum received *for work done*. It represents the average amount of a certain commodity—medical attendance—that each individual uses when he pays for it in the ordinary way. And now doctors are asked, in effect, to say: "We find that on an average each of you buys from us time and skill to the tune of 4s. 2d. a year. Go on giving us the 4s. 2d., and we shall continue to supply you—with as much of our commodity as you care to demand."

The difference between contract and private practice indicated in the above is fundamental. Does anyone in his senses believe that under contract practice the work will remain the same? The amount of medical attendance a private patient asks is a compromise between his disinclination to spend money uselessly and his fear of neglecting trivial ailments. In contract practice the former check is removed, and obviously the doctor's work must increase. It is because of this increased work that increased remuneration is asked, and it is because of the work that the Act threatens us with that Mr. Lloyd George's jibe about doubling the income of the medical profession is somewhat beside the mark.

**Resignation of
Professor Greenfield.**

THE resignation of Professor Greenfield, which was tendered to the University Court on 22nd July, removes from the Teaching Staff of the Edinburgh School one who has filled the Chair of Pathology with distinction since 1881. The influence of Professor Greenfield on the teaching of Pathology is evidenced by the number of his pupils who today fill University Chairs and other important positions, not only in this country, but also in the colonies. Professor Greenfield's fame as a teacher will not rest entirely on his work in the Department of Pathology: to many he will be remembered as a most impressive and inspiring teacher of Clinical Medicine. He carries with him the warm wishes of his former pupils.

Retirement of Mr. J. M. Cotterill.

THE expiry of Mr. J. M. Cotterill's period of office as Surgeon to the Royal Infirmary deprives the Edinburgh School of Clinical Surgery of the services of one of its most distinguished members. A man of outstanding individuality, he left the imprint of his character on all his work. As operator, writer, and teacher he upheld the best Edinburgh traditions which his long association with the late Professor Amundale had so firmly impressed upon him. Mr. Cotterill retires from his Infirmary work while still in his prime, and we sincerely trust that the increased leisure which has been thrust upon him may enable him to enjoy to the full his many pursuits and interests.

Appointment.

MR. D. P. D. WILKIE has been appointed Assistant-Surgeon to the Royal Infirmary.

University of Edinburgh Graduation Ceremonial.

At the Graduation ceremonial held on 12th July the honorary degree of Doctor of Laws was conferred on Professor H. B. Allen, M.D., University of Melbourne, and Professor R. Ramsay Wright, M.A., B.Sc., University of Toronto. Of the 45 candidates who obtained the degree of Doctor of Medicine, four were awarded Thesis Gold Medals—Thomas Graham Brown, B.Sc., M.B., Ch.B.(1906), "On Rhythmic Movements: A Contribution to the Physiology of the Central Nervous System;" John Kolbe Milne Dickie, M.B., Ch.B.(1909), "Studies on the Development of the Upper Air-Passages;" John Fraser, M.B., Ch.B.(1907), Ch.M.(1910), "An Etiological and Pathological Study of Tuberculosis of the Bones and Joints;" and Thomas Granger Stewart, M.B., Ch.B.(1900), "Compression Paraplegia." The theses presented by James Argyll Campbell, Thomas Yule Finlay, Lina Kurz, James Langwill, Alexander MacRae, Duncan Glenochie Robertson, and William Omerod Welply were highly commended. One candidate graduated M.B., C.M.; 123 M.B., Ch.B.; and 3 B.Sc. in Public Health. Diplomas in Psychiatry were awarded for the first time, the successful candidates being William Boyd, M.D.; Robert Dods Brown, M.D.; Wm. Lewis Martin, M.A., M.B., C.M.; and Geo. Dunlop Robertson, L.R.C.P.&S.(Edin.). The following awards were also made:—*The Gunning Victoria Jubilee Prize in Anatomy* to John Kolbe Milne Dickie, M.D., Ch.B.; *The Ettles Scholarship* to Samuel Burnside Boyd Campbell, M.B., Ch.B.; *The Allan Fellowship in Clinical Medicine and Clinical Surgery* to William Ewart Bullock, B.Sc., M.B., Ch.B.; *The McCosh Graduate's and Medical Bursaries* to Disney Hubert Dusch Cran, M.B., Ch.B.; *The Beazley Prize in Anatomy and Surgery* to Samuel Burnside Boyd Campbell, M.B., Ch.B.; *The Mount Scholarship in the Practice of Physic* to Archibald Romanes, M.A., M.B., Ch.B.; *The Conan Doyle Prize* to Alan William Stuart Sichel, B.A., M.B., Ch.B.; *The Amundale Gold Medal in Clinical Surgery* to George McConnell, M.B., Ch.B.; *The Buchanan Scholarship in Gynecology* to Gilbert Vere Bogle, B.A., M.B., Ch.B.; *The James Scott Scholarship in Midwifery* to William Nicol Watson Kennedy, M.B., Ch.B.; *The Dorothy Gilfillan Memorial Prize* to Janet Stewart Laird, M.B., Ch.B.; *The Pattison Prize in Clinical Surgery* to Henry James Craig Gibson, M.A., and John Owen Reid (equal); *The Cunningham Memorial Medal in Anatomy* to James Elvins McCartney; *The Straits Settlements Gold Medal* to George Carmichael Low, M.A., M.D., Ch.B.; and *The Wellcome Medals in the History of Medicine*—Gold Medal to James Simpson Rankin; Silver Medal to James Hepburn.

SOME MEMORIES OF OLD HARVEIANS, WITH
NOTES ON THEIR ORATIONS.*

By CHARLES WATSON MACGILLIVRAY.

BROTHER HARVELANS, when I was asked to undertake the onerous duties of acting as your President for the 130th anniversary of the Harveian Festival I felt that it was an honour which I had no right to refuse, more especially as, being now, alas, one of the veterans of the profession, I could not but feel that, while age brings with it a certain degree of relaxation from the arduous labours of middle life, it still has duties incumbent on it which require to be faced. And looking back on the long list of distinguished men who have occupied the chair, I felt that it was indeed an honour that it would have been ungrateful of me to refuse. I fear also that another reason which led me to accept was the fact that, so far as my memory served me—for to my shame I had not been present at a Harveian banquet for many years—the oration was not in the past taken very seriously by those who attended, and the room in which it used to be delivered was never crowded to any inconvenient extent.

The period just antecedent to a feast is hardly the time that one associates with deep thinking and lofty aspirations, and I did not greatly dread what I anticipated would be required of me, but I must say I received a rude shock when I was privileged to listen to the magnificent oration with which we were favoured last year. Such deep research and lofty ideals and high literary culture were, I sadly admitted to myself, far beyond my reach, and had it been possible I would gladly have retired from a position which I could not but feel I was totally unfitted to occupy. I felt, however, that in the long series of years in which Harveian orations had been delivered it was impossible that everyone could have attained to such a high standard of excellence, and I therefore betook myself to the study of the orations of past presidents, going back to the time, some forty-three years ago, when I began the study of medicine, and selecting those with whom I was then personally acquainted or knew by sight. As a consequence I became so interested in the personality of the orators and the subjects chosen by them for their discourses that it struck me some of you might also be interested by a brief résumé of Harveian orations in the past, with

Being the Harveian Oration delivered at the 130th Harveian Festival,
31st May 1912.

some personal reminiscences of those who wrote them. I do not propose to discuss these all in detail or to attempt to give life-histories of all their personalities, but rather to dip here and there into the past when either the subjects or the writers present special features of interest.

One of the first points that seemed to me to call for comment was the different ways in which different presidents acted as regards the honour which had been thrust upon them. In 1875 Dr. Irving of Pitlochry presided at the dinner and enjoyed the feast, but absolutely refused to deliver an oration: while in 1879 Dr. Anderson of Selkirk delivered the oration but would not remain for the feast. In the former case Dr. Gillespie, one of the secretaries, was obliged to take Dr. Irving's place, and, at short notice, to deliver the oration.

In considering the various subjects that have been chosen in the past, the first thing that struck me was that, in a large proportion of cases, they had very little relation to Harvey. No doubt he was dragged in somehow, but nearly always in a very casual way, most of the orators apparently reserving their strength till the more congenial opportunity to be afforded in proposing the toast of his immortal memory after dinner. In fact Dr. Matthews Duncan in 1876 plainly states that, while it was still the custom in London to limit the oration to a panegyric on Harvey and his works, it was more usual here to choose some great man comparatively recently deceased, and to give an epitome of his life and the influence he had exercised on his contemporaries and on the progress of medicine. Many another orator, as you will see, has followed in his steps. Even now in London the constant repetition has proved too much of a strain, and I see that this year "Spiritual Manifestations and Faith Healing" has been the subject of the London Harveian discourse—certainly a far cry from Harvey and his discoveries.

When I first came upon Dr. Matthews Duncan's dictum I felt that I had a subject ready to my hand. What more glorious subject for an oration could one desire than the late Lord Lister and the revolution which he had accomplished in modern surgery, but I could not but feel that the occasion was too recent, and that in the past few months every medical journal and most of the lay press, not to speak of memoirs and bulky tomes, had said everything that could be said of that great man. I feared I would but weary you by repetition. As to the man himself and his character, I have some slight qualifications to speak. I happen to have been

a member of his first class on clinical surgery on his return to Edinburgh as successor to Professor Syme in the winter of 1869.

I can well remember with what excitement we crowded into the operating theatre in the Old Infirmary, young lads of 17 and 18, fired by the rumours of what we had heard of dashing operations—disarticulations of the hip in ten seconds with oceans of blood and marvels of dexterity—to be met by a modest, shy, retiring figure with lisping utterance, and with nothing before him except a dozen glass bulbs filled with beef-tea, urine, and milk, on the aseptic qualities of which he discoursed in a quiet unobtrusive way. I must confess that it all came as a shock of disappointment. It was all too like the chemical lecture through which we had yawned in the morning, and we could not but feel that we were being defrauded. No doubt we were only silly boys, but what could you expect? We had had no previous experience to guide us, we had not seen epidemics of pyæmia decimating whole wards, and it was thus impossible for us to grasp the magnitude and importance of his discoveries. Even when it did come to operations, the comparison with the other surgeons of the day was not flattering. There was no dash or brilliancy, but slow methodical plodding, the immediate results covered with carbolic putty and obscured by clouds of antiseptic spray, while as to the ultimate results, though we heard that they were wonderful, we knew too little to appreciate at their true value their import or magnitude.

But to return to our subject—for Lister was never a President of this Society, though he joined its ranks in 1856—I have in all studied some thirty Harveian orations, commencing with that of Dr. Douglas Maclagan in 1854, this being the first printed record of a Harveian oration on which I could lay my hands in the medical journals of that day.

I would fain have read that of Christison, delivered in 1837, on Professor Edward Turner of London University, but no trace of it could I find. I remember the writer well—a tall, erect, commanding personage, with bushy grey eyebrows and whiskers. He was the greatest toxicologist of his time, and even in my student days, though well over seventy, an ardent volunteer. As a professor he was clear and interesting, although he had very human weaknesses. Many of his old students will remember how, when he was lecturing on curari, the arrow poison of the South American Indians, he used to come to the University a quarter of an hour before the class met to practise with the blowpipe, so

that during the lecture he might show us how the natives made use of it. A target having been placed on one side of the classroom, he would step down on the other, insert the arrow, take aim, and in a moment it was quivering in the bull's eye, while he returned to his desk amidst the rapturous applause of his class.

His social and musical qualities were on a par with his scientific. Was he not one of the famous medical quartette—Christison, Bennett, MacLagan and, I think, Wood—who used to charm the after-dinner moments of the guests on such an occasion as this?

Then there was Willie Brown in 1844, a quiet, kind, little man, whom I attended in his last illness, an active Fellow of the Royal College of Surgeons until the time when a candidate proposed by him was rejected, after which he never darkened its doors again.

Then came the greatest of them all, Sir J. Y. Simpson, who presided in 1848. What the subject of his oration was I cannot discover. From such a genius it must have been worth listening to. Those who saw him once could never forget his personality. A stout, squat, little man, with a lion-like head and charming manner, whose genius and what he did to relieve suffering humanity have rendered him immortal. Well do I remember how he used to drive up each morning to the University in an open carriage, wearing a magnificent sealskin coat with the fur outside, and what an impression he made on our young minds.

Of Sir Douglas MacLagan's oration not much requires to be said. He gives a charming sketch of Dr. Abercrombie, who, though he failed to attain to the Professorship of Medicine, made for himself a name that should never be forgotten in Edinburgh, not only for his scientific attainments and success in practice, but also for his goodness, benevolence, and religious example.

Of Sir Douglas himself what can one say? A many-sided man of many attainments, he was not the least distinguished of a notable family of brothers who came to the highest positions in the Church, medicine, and insurance. He was a splendid singer, an enthusiastic volunteer, the life and soul of any gathering, a general favourite, one who was universally loved and respected, and who attained to the highest positions in his profession as a professor and President of the Royal College of Physicians. He was perhaps the only man who was both a full surgeon and, later on, a full physician to the Royal Infirmary. Of him it used to be told that

as a surgeon his hand was so steady that on one occasion, when performing an amputation by transfixion, the blade of the knife snapped, but so skilful was he that he kept the broken parts in apposition and finished the operation without a hitch! An apocryphal story, I fear, and on a par with that of another distinguished Harveian, Dr. P. D. Handyside, who, though for many years a secretary of the Society, never appears to have accepted presidential honours. He also was a surgeon to the Infirmary, and had the doubtful credit of designing the longest amputation knife on record. I do not know if it still exists, but I can remember its being in the Royal Infirmary when I was a house surgeon. It had a blade certainly eighteen inches in length, but the only use to which it was then put was that of cutting up the large annual Christmas cake. Tradition had it that it was only once used on the human subject for a disarticulation at the hip. In forming the anterior flap it transfixed the patient's thigh, the scrotum, and the other hip, and with the second plunge it transfixed the thigh, cut a dresser's fingers, and perforated Mr. Syme's coat tails.

In many other ways Dr. Handyside was remarkable. He was a tall, thin, saturnine man, with a grey moustache and mutton-chop whiskers, and a grand manner. When I knew him as a lecturer on anatomy at Surgeons' Hall he must have been well over seventy. This was before the days of formalin injections, and he used to anoint his huge hands with lard so as to prevent any disagreeable effluvia, with, I regret to say, singularly poor results; but whether this was due to himself or to the singularly ancient long blue frock coat with a velvet collar which he always wore, it was difficult to say. In any case, his advent was always ushered in before his presence by an aroma that was not of Araby. And yet as a young man—for he only again took up lecturing in later life when all else had failed—he used to be somewhat of a dandy, and always lectured, I am told, in white kid gloves. He was a truly good man, kind-hearted and well meaning, who exercised a good influence over his students, and conducted a Bible-class for their benefit every Sunday morning.

Drs. Malcolm and Inglis, who presided in 1856 and 1857, were men of a totally different type. The one, Dr. Malcolm, was a tall, handsome, dignified old man, with a large family practice, who took for his subject the rise of the Edinburgh School of Midwifery, and tells us how the first Professor, Gibson by name, held the position for many years without ever delivering a systematic lecture, to the

great satisfaction, I am sure, of his numerous students. Only on the appointment of the third occupant of the chair was a regular course of lectures instituted, and only then apparently because a rival sprang up in the extra-mural school.

The other, Dr. Inglis, was a shy, retiring, white-haired, stooping old man, of great attainments, but unpractical. His discourse on "The Therapeutical Value of Medicinal Agents" is most lengthily, learned, and obscure. How the members of the Harveian ever got to dinner that night I cannot imagine.

In 1860 Professor Miller occupied the chair. As to him I cannot say I have any very clear recollection. So far as I can remember, he was a cheery, handsome man, a great favourite with his patients, a good speaker, and sworn enemy to alcohol. He was cut off in comparative middle age from infection following on a rectal examination. His oration on "*Hora Harveiana*" is interesting and brief—on "What we can learn from a consideration of Harvey's life"—showing how a small insignificant man, not gifted by Nature, and with no original natural talent or genius, by sheer hard work and with the help of a liberal education, by having a good mother and marrying early, and, notwithstanding the disadvantages of the atmosphere of a Royal Court, by sticking through thick and thin to what he believed to be the truth, rose to an eminence in his profession unequalled by any, and came at last to a peaceful and happy old age. That he was an advocate of temperance is, in Professor Miller's opinion, amply demonstrated by the fact that, when suffering from gout, he employed cold water as an outward application. In fact he sat through the night on the roof of his house with his feet in a pail of cold water, and when he died he bequeathed a coffee pot to his heirs. The moral to be derived from his life is to go and do likewise—to retire early from work as age comes on, for a Sabbath rest is necessary in life as well as every week, and not let the arrogance of age prevent belief. All the men of his time who believed in Harvey were under forty years of age. The end of the address was taken up with pointing out how in many points the great Alison, who had just died, resembled Harvey.

We next come in the following year to Dr. Charles Bell, who joined the Society as far back as 1841. Many of you must remember him—a tall, heavy-looking man with white hair, who, though he wrote many papers and posed as a great authority on his speciality, never seemed to get on. One remembers him as apparently living from hand to mouth, still acting with young men

as a dispensary official, and, when nearly eighty, attempting again to start lecturing. His subject was "The Science of Midwifery in the Time of Harvey," and how Harvey's investigations *de generatione* and *de ovo* advanced the study of development. As to the men-midwives of that time, he gives many amusing details—how they believed that the planets influenced conception, but should these fail, a loadstone should be carried in the pocket, or the uterus of a hare cooked in malmsey, or the testicles of a fox in sheep's milk should be eaten. In the case of delay during pregnancy a stone should be applied locally to draw down the child like a magnet, while, as a last resource, the application of the hoof of a horse or a piece of coral would prove efficacious.

From that time onwards, until 1866, though presidents existed, I can find no trace of their effusions. In that year Dr. Halliday Douglas occupied the chair and gave an interesting address on Dr. Alison, being an estimate of his character rather than a sketch of his life.

You must all remember the author who only was taken from us a few years ago, full of years and honour. He was a handsome, shrewd little man who, so far as I know, was the only individual who was ever appointed as full physician to the Royal Infirmary at the age of 21. Though young, he must even then have had much decision of character, as I remember the late Sir Patrick Heron Watson telling me that when he was house physician, having been detained one morning and while hastily going round the wards in carpet slippers, he was surprised by Dr. Douglas, who informed him that he neither appreciated the dignity of his office nor the respect due to his chief, by appearing in the wards in such garb.

Alison must have been a great personality, from the respect and admiration which he evoked from his contemporaries. He was a true Christian and given to good works among the poor, a great writer and thinker, rather than a great scientist, making important deductions from the observations of others. I cannot say I have ever read any of his great works, and, from a specimen given by Dr. Douglas, I fear I should not gain much benefit from them. In a controversy between Alison and Thomson as to the identity or otherwise of smallpox and chicken-pox, Dr. Alison remarks that "any nosological arrangement of febrile eruptive diseases which is founded solely upon the appearance of the skin cannot be justified without losing sight of the useful practical purposes which render it important that diseases should be classi-

fied at all, or studied in connection." This no doubt, contains a great and fundamental truth, but for myself I must confess that, though I have a hazy notion of what he is driving at, I have no desire to pursue the subject further.

The following year, 1867, Benjamin Bell occupied the chair, and, following the traditions of the Society, took as his subject "The Life, Character, and Writings of William Hey of Leeds."

Which of us who knew him can forget the writer—a dear, sweet, white-haired old man who, before the advent of specialists, was a great authority on eye diseases, and who worthily upheld the renown of one of the old medical families of Edinburgh. The Bells, the Gillespies, and the Woods had for generations given of their best to the profession, but now, alas! they are dying out, and only our dear friend, Russell Wood, remains to uphold the traditions of the past.

As to Hey, who does not know his name as the founder of the Leeds Infirmary and the forerunner of the many distinguished men who have made that surgical school famous? The son of a farmer, he became the distinguished contemporary of such great men as Cheselden, John Hunter, Pott, B. Bell, Desault, Abernethy, and Astley Cooper. A great surgeon, theologian, and lover of music, he studied anatomy and surgery in London, but refused to go to Paris because he feared for his morals; and though severely handicapped by the loss of an eye in childhood, and permanent lameness from accidents, he did so much to advance the progress of surgery that his fame spread throughout the British Empire. Even yet every student knows his name, from his saw, his ligament, and his disarticulation, not to speak of what he did for brain surgery, hernia, dislocations, and excisions, while his treatise on *Derangement of the Knee Joint* still remains a classic.

The following year, 1868, Dr. Alexander Wood tackled the vexed question of preliminary education, or the general culture required by the student of medicine. He was a most learned man, and I believe only lost the chair of Practice of Medicine, when Laycock got it, by one vote. I can only dimly remember him driving about in an open carriage and pair, but by that time he had practically abandoned medicine, and had taken to managing the Tramway Company. His address is most erudite but dreadfully dull, and consists of a plea for the study of grammar, classics, and logic, with a tirade against merely utilitarian facts and knowledge and the study of modern languages. Education, to his

mind, was a training in methods, not a question of facts. Most medical students will utter prayers of thankfulness that his ideas never came to full fruition.

Curiously enough, I have been unable to discover any trace of the orations by Dunsinure, Gardiner, Spence, Turnbull, or Paterson. I know indeed that Dunsinure wrote on Sir George Ballingall, Spence on John Bell, and Paterson on Syme, but where their papers were printed I have been unable to discover, though probably the latter's book on Syme was an extension of his Harveian oration. I therefore pass on to that of Dr. Omond in 1874, one of the most interesting of the series, as it gives much delightful information as to the early days of this Society. Dr. Omond I remember well—a dark, almost Oriental-looking man, much beloved, and at that time the Secretary of the Royal College of Surgeons.

How many of you, I wonder, know anything of the origin, early history, and vicissitudes of the Harveian Society? To start with, it was a mere offshoot from the Æsculapian Society which was founded in 1773 by the Professor of Medicine, Dr. Andrew Duncan, in order that a select number of Fellows of both Colleges might meet and sup together several times a year. After three years devoted to the pleasures of the table they evidently thought that, to justify their existence, they ought to do something for the students of medicine of Edinburgh, so they offered a yearly prize of five guineas, no small sum at that time, for the best essay by a student. Their number, however, being small, this proved too great a tax upon their pockets, so they formed the Harveian Society on a larger basis, admitting as members a selection from among the practitioners of the Lothians and Naval and Military Medical Officers. The first meeting was held on 12th April 1782, being the anniversary of Harvey's birth, and was followed by a dinner.

Thus started the Harveian Society, or, as it was then more popularly called, "The Circulation Club," and for a time its numbers rapidly increased. The prize essays became a great success, but, alas for our national pride, all the prizes up till 1783 were gained by English or Continental students. Then Ralph Irvine of Lanark appeared, and for two successive years carried off the prize, to be followed, however, by three Americans.

The dinner, however, continued to be the chief attraction. Its hour was three, and the annual assessment only 6s. This, together with the sums gained in wagers, seems to have been enough to provide a dinner of three courses and a bottle of port or claret to each present, including four to six guests. Our ancestors seem to have

been a much more sporting lot than we are now. They bet on the most varied subjects—from marriage to rum, and from Bills in Parliament to new professors.

But Edinburgh Society then seems to have been very similar to what it is at present, and, like the Athenians of old, it was always seeking after some new thing. The members of the medical profession and this Society, having for four years devoted their attention to their brains and stomachs, now directed their energies from the cult of their minds to that of their bodies. As a result, the Gymnastic Society was founded in 1786. This consisted mostly of members of the two original Societies, and during its existence of 25 years it rather put its seniors in the shade, and medical men seem to have devoted all their spare time to golfing, swimming, and bowls. The attendance on the Harveian dinner consequently dwindled. But, as so often happens, as the original members grew infirm they did not pass on their energy to their successors, and the Ludi Apollinaris, as the annual meetings were called, practically ceased for several years. No one came forward to contest them, until at last a special prize was given to Dr. Duncan for golfing *solus v. solo*; while a few years later three prizes were given, first, to Dr. Hamilton, victor in golfing, because although absent he had intended to have golfed, and none came to oppose; second, to Dr. Barclay, victor in bowling, for his decided superiority; and, third, to Dr. Cheyne, victor in swimming, because had he gone into the sea he would have beat Dr. Duncan, who did not swim that day.

The Gymnastic Society finally became a small dining club in Leith, and on Dr. Duncan's death it dissolved, bequeathing its medals and pocula to the Esculapian Society, where they still ornament the table on guest nights.

The annual address which forms part of the Harveian Festival was first inaugurated in 1795, and the original recommendation was that it should consist of a panegyric in praise of some illustrious medical man, a custom which, as you have seen, still prevails to a great extent. The prize essays had by this time fallen into abeyance, no students coming forward to compete. New customs seem to have been gradually introduced, especially on the Society's coming of age in 1803. Prizes to students having ceased, the Society took to giving diplomas to themselves. The first recipient was Dr. Andrew Wood, the then President. At the same time the office of Chaplain to the Society was instituted, an office which, as you know, continues to this day, and which, though recently vacant,

has now, I am glad to say, been filled up by the appointment of the Rev. Dr. Wallace Williamson.

The first Pontifex Maximus, as he was then and still is called, was the Rev. Dr. Moodie, who was followed by Drs. Dickson, Ritchie, and Grant. The last I well remember, a grand old man—"Ursa Major" he used to be called—who, when well on in the eighties, still never missed a dinner. He was a short, thick, somewhat gruff-looking man, but had a heart of gold and a power of impressive old-world oratory that I never heard surpassed. To hear him say grace was of itself a liberal education.

In 1822 not only were the rules relaxed as regards guests, but extraordinary members were also instituted, Raeburn the artist being the first, to be followed by Dr. Alexander Boswell as poet laureate, and later by John Wilson, better known as Christopher North. University prizes and medals were also instituted, a custom which did not cease until 1864. I am not sure that some of these past customs might not with advantage be reinstated. We are now sadly lacking in poet laureates, and but for James and Fordyce I do not know what we should do for original songs and compositions.

The next year, 1875, was the occasion to which I have already referred, when Gillespie, the secretary, gallantly stepped into the breach and did the work of the recalcitrant Irving. He was more deserving of praise than appears on the surface, for when he had collected all the data for an address on the medical knowledge of Shakespeare, he found out that someone had already written on that subject, so in a hurry he was obliged to prepare a discursive dissertation on "Medical Notes about Shakespeare and his Times."

Dr. Matthews Duncan and Professor Harvey followed in 1876 and 1877, the one taking William Hunter and the other Dr. Alison as his subject.

Many of you must remember Matthews Duncan, a squat, somewhat fat man, with long hair and a biting tongue, who was one of the *corpora cili* upon whom Sir J. Y. Simpson experimented with chloroform. He finally left Edinburgh a disappointed man, to revolutionise gynaecology in London. He was a true friend and a pleasant companion, but you had to know him first. Many were the stories told about him, for his broad Doric tongue was nothing if not plain spoken. One can imagine the feelings of the titled lady in North Berwick whom he went to see in consultation, and who, when he left, pressed a five-pound note into his hand, with the remark that he might give it to one of his children. "Thank

you, mem," he replied, "I shall do so. My fee is twenty-five guineas." And he got it. Later on at St. Bartholomew's he as a new arrival was asked to see a case of cancer of the liver. "This is not a case of cancer of the liver," was his only remark. "But doctor, don't you feel——" said someone. "This is not a case of cancer of the liver," interrupted he, and walked away. Three weeks later he was asked to attend the post-mortem, and there was the liver, enlarged and nodular, greatly to the glee of his colleagues, who thought they had scored on the newcomer. "A varra extraordinary case. I don't remember having seen another like it. I saw this case in consultation three weeks ago, and he was not then suffering from cancer of the liver." I remember attending his class at a time when there was much discussion on the question of the expulsive power of the uterus. "There are some individuals," said he, "who affirm that the expulsive power of the uterus is 'so and so.' Were that the case, gentlemen, it would not be the duty of the accoucheur to assist the child into the world, but rather to sit on the top of the patient with the nurse on top of him, and give notice to the neeboors on the other side of the street to put up their shutters so as to prevent the infant from doing injury to its surroundings on its advent into the world."

Dr. Duncan takes as the subject of his oration "The Life of William Hunter," the elder and perhaps the less well-known brother of John Hunter, and, after a panegyric on Harvey as the prince of physiologists, he points out that for all of us there is no guide so useful as the example of a great and good man, after which pious opinion he descends rather to the worldly, and continues that there is no incentive to high endeavours more powerful than applause or hope of fame. This may be true, but we would prefer to have had it differently expressed.

After pointing out his reasons for choosing William Hunter, he proceeds to give us Hunter's opinion of Harvey, namely, "That in merit Harvey's rank must be very low indeed; that he merely appropriated the work of others and dressed it up into a system; that this required no extraordinary talents, though it made him immortal; and that none of his writings show him to have been a man of uncommon abilities." Duncan goes on to say that, notwithstanding all this, Hunter was a great admirer and believer in Harvey. This may be so, but certainly his manner of expressing admiration is somewhat original.

His epitome of Hunter's life is most interesting. He sprang

from a small farmer stock near Lanark, worked with Cullen, went to London, and became a great anatomist and fashionable accoucheur—a curious combination, as Duncan admits. He helped his better-known brother, John Hunter, to rise to fame from being a cabinet-maker's apprentice. He died unmarried, and bequeathed his museum to Glasgow. Duncan finished up by commending Harvey for leaving funds, not only for an oration but also for a feast, and seems to indicate that others might well follow his example.

Professor Harvey, the learned Professor of Medicine of Aberdeen, then follows in 1877. Like Dr. Halliday Douglas, of eleven years previously, he takes Alison as his text. But considering his work from a different point of view, namely, its relation to Harvey's, he shows how Alison explained those points in the circulation that had been omitted by the former—how neither the heart nor the elasticity of the blood-vessels were sufficient in themselves to propel the blood, and how vital affinities and attractions and repulsions filled the gap. One can only say, "Is that so?" and pass on.

Why Sir William Turner's oration cannot be found I fail to understand. It must have been published somewhere and is sure to have been interesting, but I do not even know what his subject was.

The next year, 1879, we have a most charming address from Dr. Anderson of Selkirk, the gentleman, you may remember, who gave the address but refused the feast. He tells us how, being incapable of a scientific address, and knowing very little of Harvey, he had been induced by the secretaries—who had told him that the Society was rather sick of Harvey—to give some reminiscences of forty-five years of country practice in the south of Scotland. Time will not permit of my giving you extracts from his most interesting address, but it certainly shows him to have been a most shrewd and capable practitioner. He pleads for old and now given-up methods—bleeding in pneumonia and head injuries, blistering and mercury, and for natural labours when possible, even at the risk of weariness to the flesh and waste of valuable time. How different from some other and more modern practitioners further south. I always remember how a friend of mine, now dead, some twenty years ago, thought of setting up in a crowded part of London and buying a practice. On looking over the books of the vendor he expressed surprise at the number of midwifery cases appearing in his ledgers, and asked how he could possibly get through them in the time, even with the help of forceps and turning. "Forceps and turning!" said the man.

"In cases of difficulty I have no time for those sort of things; I always use a cephalotribe. You get it all over in no time, and there are such a lot of children about here, one or two more or less don't matter."

As regards surgery in the country, Dr. Anderson explains its difficulties and how it comes to be very much a question of amputations, tracheotomy, and hernia. As to the antiseptics of that time, he shows how the pure air of the country with absolute cleanliness obtains excellent results, and how impossible it would be to ride twenty miles into the country with a steam spray strapped on one's back. He prophesies that greater experience will lead to greater simplicity and equally good results; that antiseptics will be given up and asepticism will prevail. What a true prophet he was we all know.

Again a hiatus occurs, and Haldane's, Littlejohn's, the centenary address of Sir Douglas MacLagan, and that of Dr. Cornel of Peebles are not to be found in the current literature.

We now pass on to 1884, and the address delivered by Dr. Keiller on the occasion of the Tercentenary of the University. I wonder how many of you here can remember him, a little red-faced, side-whiskered cherub of a man who still often wore the white necktie of his predecessors, and, I doubt not, had the gold-headed cane at home, though he did not always carry it about with him. He was a most amusing and popular lecturer on midwifery at Surgeons' Hall.

As to his oration "On Reminiscences of the Medical Profession in Edinburgh Fifty Years Ago," it is to my mind one of the most interesting of the whole series, interesting because so entirely personal, though written in the worst English I ever read.

He details how he was destined for the ministry but instead devoted his attention to churchyards. Living as a medical apprentice in Adam Square, he well remembered the old Kirk o' Field being removed from what is now the University Quadrangle, how the earth and rubbish with numerous bones were employed to construct the present Mound, and how he and a friend in the dead of night gathered therefrom an extensive osteological collection. One is very apt to consider the tragedy of Burke and Hare as being ancient history, like the '45 or the French Revolution, but here we have a man whom I knew well who was through the thick of it, who remembers Burke's execution, and how it was the *chic* thing for ladies to have purses made out of his skin. Ordinary resurrectionists were rife, bodies costing from £10 to £15, and

cadavera were also imported from Ireland and other parts in tea boxes and orange cases. Any man seen carrying a box near Infirmary Street was apt to be mobbed by crowds crying "Shusey, shusey," the French "*sujet*"—another example, like ashet and gigot, of the early connection of Scotland with France—and was fortunate if he escaped unscathed. Knox was, he is sure, quite innocent of all knowledge of the crimes, and was a grand teacher.

Liston and Lizars used to operate on Sunday after morning church in the centre tower of the Old Royal Infirmary, the minister of Lady Yester Church opposite stopping his discourse whenever he heard the bell ring to allow the students to clear out. Many stories, amusing and otherwise, are told of these two surgeons, but they are too long for repetition, and various old medical scandals are revived, such as, that Syme bought the chair of Clinical Surgery from his predecessor, Russell, for £300 a year, and in consequence received a challenge, if not a horse-whipping, from Fergusson. Interesting personal reminiscences of Simpson, Duncan, Dick Mackenzie, Turner, Miller, and Spence are also given. In fact, for an epitome of medical life in Edinburgh in the early middle of last century, nothing better could be imagined.

The late Sir Patrick Heron Watson does not seem to have ever published his address, but he was always a busy man, and in 1885 had little time for anything except his professional duties. It was no uncommon thing for him to have from 20 to 30 private patients waiting to see him of an afternoon. His was a most imposing presence, and he gave one the impression that his knowledge was infallible, which was not always the case. I remember what a shock it was to me when I first came to examine with him on surgery and he annihilated a trembling student who introduced the pampiniform plexus in connection with varicocele with, "Pampiniform plexus indeed; that is an obscure plexus of veins in the abdominal cavity, and has nothing whatever to do with varicocele." But then he had forgotten more than most people had ever been able to remember, while his real kindness of heart and generosity to students, hidden under a somewhat stern and repellent manner, will never be known. As an operator, when at his best, no one could touch him. He had the elegance and rapidity of pre-anæsthetic days when speed was the great desideratum, while as to the range of his operations, he was a generation before his time. He had excised the larynx and spleen, and had performed hysterectomy when such operations had hardly been thought of by others.

He was followed in the Presidential Chair by the ever young Dr. McDougal, originally of Galashiels and subsequently of Carlisle, who now does most of the surgery on the Riviera. He took dear old Professor Spence as the subject of his remarks, and showed what an influence his teaching and writings have had on modern Scottish surgery. It seems but yesterday that he was with us, a thin, sad-looking man—dismal Jimmie was his pet name among the students—but with a great saving sense of humour. With beautiful hands and great elegance in operating, his other extremities were his weak points. The top of his head owed more to art than Nature, while his feet were always encased in very tight patent leather boots, which ultimately led to the senile gangrene from which he died. I shall never forget one day when I was walking with Walker, the oculist, and we met Spence with his most dismal expression, all clothed in black and crape. "Seeing some of your work home, Jamie?" said Walker, and a grim smile illuminated his features as he shook his stick at us and passed on.

George W. Balfour, one of our greatest Edinburgh heart specialists, who began life as a veterinary surgeon, gave us in 1887 a most charming address on the "Evolution of Cardiac Diagnosis from Harvey's Days till Now," and showed how for 200 years after Harvey's discovery it remained barren and useless until auscultation and percussion gave a new impetus to investigation. He then follows up the gradual evolution of a knowledge of the details of heart disease. He was a charming man, much beloved, but he had occasionally a most unfortunate manner with patients. I believe the story is true that on one occasion, when called in to see a lady who had almost died from hæmorrhage and was lying with closed eyes and a pallid face, he turned and said, "Why have you called me in here? she is dead, man." "No, Dr. Balfour," said the lady, "I'm not dead, but I don't think I shall trouble you any more."

I remember a very similar incident in my own experience. The manager of a theatrical company was very ill with heart disease, gasping for breath, and I called in Balfour. "What are you giving him?" "Fresh infusion of digitalis," I replied, "in tablespoonful doses." "That's no good," said he; "give him half the bottle." "Rather a big dose," said I. "Not at all. I remember Matthews Duncan calling me out to a similar case and he just said what you do, but when I went back in the evening there he was lying down and breathing like a child. He was dead

the next day certainly, but that had nothing to do with it." So the patient had the dose, and I met Balfour the next day. "Well, how's the patient?" "It was really marvellous," I said; "there he was in the evening lying down and breathing like a child." "Didn't I tell you so," said Balfour. "Yes," I said, "but he was dead the next morning, just like your other patient."

And now we come to John Smith. Which of you did not know and love him, and who does not grieve for his recent death, even though it was full of years and honours? One will never forget the trim figure and humorous face with the twisted neck. He was the poet, songster, and secretary of many clubs, one who wrote pantomimes or founded a dental college with equal excellence, and who soothed his later days by taking to oil painting. I only met one man in all my life who could say anything against him, and that was a distinguished general in command in Scotland, and he only complained of his methods, while he allowed his personality was charming. He asked me one day if I knew Dr. John Smith, and I replied, "Yes, a most delightful man." "He certainly is that," he replied, "but I don't like his dry system of dentistry." "What is that?" I asked. "Oh, don't you know? I thought it must be a Scottish speciality. I went to see him the other day. In London my dentist provides a velvet-covered chair, but he sat me in one with dry sticky American oilcloth, and my back hair stuck to it. Then he examined my mouth, and filled it with fingers and instruments. My London dentist always provides a tumbler of hot water with eau de cologne for me to wash out my mouth with, but when I asked him for some hot water he said he really did not think it was necessary. No; on the whole I don't like your dry system of dentistry."

His oration on "The Days of Harvey, their Literary, Political, and Social Aspect," is a model of what such an oration should be. He epitomises everything and omits nothing. Harvey, his history, family, and work are touched off with a master hand. Society in Harvey's time, London, its topography, its customs high and low, the poets, statesmen, dramatists, writers, naval heroes, and medical men of that time are all described; the monarchs and journalists, the Puritans, the Irish question and executions, the social and domestic aspect of the people among whom a doctor of that time moved, their politics and theology, their dress, the army, the Church, and the country gentleman—nothing was too insignificant for him to notice. Even the food and drink of the three kingdoms are touched on, especially the drink—ale, metheglin, baggot,

mead, cider, and perry for England; milk and strong waters and usquebaugh in big glasses for Ireland, these being the more natural for that nation. Inexplicably Scotland is omitted, probably because it was like Ireland with the milk left out. American drinks and tobacco are also brought in, while the comparative positions of physicians and surgeons and their work are alluded to. How so much information could be compressed into such a short space is wonderful.

The following year, 1889, Professor Bell Pettigrew took up the task with "*The Great Pioneers in Medicine before Harvey and including Harvey*," one of the most exhaustive, compendious, and elaborate of orations. As one read it one could only think of the remark made in a past generation—"And still the wonder grew, That one small head could carry all he knew."

He begins by pointing out how little we really knew of the pioneers in medicine before Harvey, and what a cruel fate awaited early scientists and original inquirers, such as Socrates, Servetus, and Vesalius; how great discoveries were only gained by hard and unremitting labour; how modern discoveries were helped by early research; and how the greatest discoverer cannot discover anything that does not exist. Alluding to the obscurity which exists as to early medicine among the ancient Egyptians and antiquated Chinese, he passes on to the historical period, and points out how medicine is philosophic and scientific, and so philosophers contributed to medicine and physicians to philosophy, and then with one fell swoop we are in the midst of men and systems. Greek, Roman, and Arabian medicine rapidly follow one another, while Æsculapius, Pythagoras, Hippocrates, Plato, Aristotle, and many others jostle one another on the busy stage. We are told who they were and what they did right on through the ages, till our brains reel and we run up against Harvey at the end with a sense of rest and relief.

Pettigrew in Edinburgh as Pathologist and Conservator at the Royal College of Surgeons was before my time. I can only remember him when, after the troublous times of early life, he had come to live a comfortable married life in the quiet haven of St. Andrews.

And now we come to one of the orations that one could ill miss, that of Dr. Alexander Peattie, who in 1890 gave us of his best on "*Dr. John Brown and his Life and Work, with Narrative Sketches of James Syme in the Old Minto House Hospital and Dispensary Days.*"

Most of you must remember Dr. Peddie. It is only a few years since he passed from among us when he was nearing the age of a hundred. One can still see him with his beautiful white hair, firm mouth, and kind eyes. He was always my idea of what St. John must have been as an old man in Patmos. He was one of the old guard, the contemporary of Christison and Bennett, Sir Douglas MacLagan, Smith, and Littlejohn, some of whom were older and some younger than himself. Of them all, only Sir Henry now remains.

As he himself says, nothing new could be said of Harvey, and he was too old for scientific research, so he took his two ideals, Syme and Brown, and tells us about them—the one keen, hard, and sharp as a razor, who “never wasted a word, nor a drop of ink, nor a drop of blood”; the other sweet, spiritual, and full of goodwill and loving-kindness to his fellow-men, with his humorous face and twinkling eyes behind his spectacles and his blue shepherd’s tartan bow necktie. Who having met him could ever forget his sunny smile, which, though every now and then overclouded, always shone forth again when the clouds rolled by. And yet with it all how clever he was. Who but a genius could have answered his old friend Russell of the *Scotsman* as he did? Russell met him one day and said, “Brown, old friend, I don’t know what they are going to do with me when I die. If I go to heaven I’ll be expected to sing hymns, and I don’t know one note of music from another; and if I go to the other place, it’s said there is always gnashing of teeth there, and I haven’t got a tooth in my head.” “Don’t you fash yourself, Russell, ma man,” said Brown, “teeth will be provided.”

Minto House, as you will remember, was the prototype of the modern nursing home. It was originally a public hospital and dispensary, set up by Syme when he could not gain admission to the Infirmary, and run by himself and his apprentices, of whom Brown and Peddie were two. When Syme became professor it was kept up as a private hospital by Peddie, Brown, and Cornwall under a board of directors, Peddie continuing in full charge for five years till it came to an end in 1852. What stories he tells of those early days when Rab and his Friends were in the flesh, and what a graphic picture he gives us of Brown’s ministerial ancestry and early life—how, when past middle life, he took to literature, and what exquisite writings he gave us, with all the strength, sweetness, and pathos of his own life worked in.

Dr. Gillespie followed the next year, on his own account and not as a substitute for a recalcitrant president, but of the subject of his discourse I can find no trace. But this is only one of a series of extraordinary facts. How such capable men as Gairdner, Turner, Haldane, Littlejohn, MacLagan, Watson, Grainger Stewart, Struthers, Yellowlees, and others could be at the trouble of composing what must have been most interesting discourses and yet never published them is to me inexplicable; yet not a trace of their publication is to be found.

After Gillespie came Strachan of Dollar, with a most interesting and learned discourse on "The Blood is the Life." He goes into deep questions of physiology as to when the food which is taken into the body becomes living matter, and shows how the red blood corpuscles are not mere carriers of oxygen, but also supply the vital force. What must even more excite our admiration and gratitude is that, of all the members of the Harveian, he alone of recent years is the one who was willing to accept office twice, and two years ago, after an interval of eighteen years, he gave us further investigations into the same subject in his paper on "Cell Life and the Life Cell in Animal Physiology," in which he shows that the essential of life is protoplasm, and considers again the deep question of the origin of life and vital force in the body.

It is really very curious that at this stage we should again have a hiatus of three years, from 1893 until 1895, during which we should have such distinguished men as Sir Thomas Grainger Stewart, Sir John Struthers, and Dr. Yellowlees as Presidents, and yet be unable to find any trace of their addresses. Dr. Yellowlees is fortunately still with us, though he has retired from the important position he occupied as the Doyen of Psychological Medicine in the West of Scotland. The other two have so recently passed from our midst that it seems presumptuous of me to even describe them—Grainger Stewart bland, suave, and impressive, with a great sense of the dignity of his profession; and Struthers, the great anatomist, the dogged fighter, with the stern blunt exterior and the kind heart.

Dr. Peel Ritchie in 1896 chose for his oration the college which he so loved and presided over. "Early Knights and Days of the Royal College of Physicians" I believe he first called it, but, as you know, it subsequently appeared in an extended form as a large volume, giving interesting accounts of various distinguished Fellows and Presidents of that Royal College and notes of various interesting episodes in its history.

Of Joseph Bell, who followed in 1897, what can one say? Our loss is too recent. He was the last of a long line of distinguished medical men, and by no means the least talented of them. He was clever and shrewd, kind-hearted and liberal, a fine operator, with a wonderful knowledge of men and a power of inductive reasoning that at times was positively uncanny, but of that I have no need to speak. He was the prototype, as you all know, of one of the best known characters in modern light literature. Well do I remember the gaping astonishment of an outpatient to whom he suddenly remarked, "Of course I know you are a beadle and ring the bell on Sundays at a church in Northumberland somewhere near the Tweed." "I'm all that," said the man, "but how do you know? I never told you." "Ah," said Bell, when he had left, bewildered, "of course gentlemen you all knew about that as well as I did. What! You didn't make that out! Did you not notice the Northumbrian burr in his speech, too soft for the south of Northumberland? one only finds it near the Tweed. And then his hands. Did you not notice the callosities on them caused by the ropes? Also this is Saturday, and when I asked him if he could not come back on Monday, he said he must be getting home to-night. Then I knew he had to ring the bells to-morrow. Quite easy, gentlemen, if you will only observe and put two and two together."

His oration is like himself, concise, explicit, and to the point, commencing with a life-history of the family of Bell in Edinburgh from the earliest times and of their connection with our Society, and followed by a short but full life of Harvey, a résumé of the foundation of the Harveian Society, and a history of surgery from Harvey's time onwards.

Of Ballantyne, who followed Bell, no trace of an oration is to be found in any journal. It is like his modesty not to think it worthy of publication. He is one of the best types of provincial practitioners, and one of the best beloved, kind, clever, and most courteous of men, now enjoying the *otium cum golf* at Gullane with the *dignitate* that always distinguished him.

Crum Brown, who followed, fortunately for us is still with us. The great chemist, for long the able and beloved secretary of this Society, the born raconteur and the true and genial friend, his discourse on Dr. John Mayow is most interesting, giving as it does the life and work of one about whom little was known. He was a small boy when Harvey died, and only lived until he was 36, but in that time he anticipated by a hundred years

the discoveries of the so-called new chemistry. He left only four papers—on “Oxygen,” on “Respiration,” on “The Effect of Oxygen on the Blood,” and “How Heat is Formed in the Body”—each of which, though naturally full of errors, contains truths which were only rediscovered a century later.

Mr. Annandale, who follows in 1900, is, as one would expect of him, short and practical on “Transfusion and the Newer Methods, and Results Attained by it.” You all knew him and what he did for the Edinburgh Medical School and practical surgery. He was one who lived for his work and died in harness.

Dr. Robert Farquharson I never met, and what the subject of his discourse was I cannot discover. The place which he occupied in the political world is known to all of you.

In 1903 our old and dear friend, John Chiene, gave us of his best—a racy and amusing discourse on the founding, early history, and development of the Royal Infirmary of Edinburgh. It is, I need hardly say, crammed full of those happy touches of facts and pithy humour which distinguish all his speeches and writings.

Charles Underhill on “Harvey as a Teacher,” Croom on “The Times of Harvey,” and Clouston on “Blood and Mind,” are all, as one would expect, admirable, but they are all too recent for me to comment on.

The sad death of Finlay during his period of office deprived us of a discourse which one feels sure would have been full of practical interest. I have already alluded to Dr. Strachan’s philosophical discourse and the high ideals of Sir Alexander Simpson’s masterly oration of last year.

I must apologise, gentlemen, for having detained you so long from the much more attractive menu which still awaits us. I feel that my methods of dealing with such a serious thing as a Harveian oration are not such as will commend themselves to many of you, being, I fear, somewhat flippant and personal, but if they have helped you to wile away a weary hour of waiting for better things I shall rest content, knowing as I do that in speaking of some of those great men of the past, if I have extenuated but little, I have certainly not set down aught in malice.

COMPLETE ABSENCE OF THE VAGINA: REGURGITATION OF MENSTRUAL BLOOD THROUGH THE FALLOPIAN TUBE INTO THE PERITONEAL CAVITY; WITH NOTES OF AN UNUSUAL CASE.

By WM. FORDYCE, M.D., F.R.C.P.

Assistant-Gynecologist, Royal Infirmary, Edinburgh.

M. W., æt. 19. a small somewhat poorly-developed anæmic girl was admitted to the gynecological ward in Leith Hospital under my care on 3rd August 1911, complaining of severe pain in the lower part of the abdomen. The history of the case which I got from the girl's mother, for the girl herself is dull and stupid and evidently somewhat deficient mentally as well as physically, was as follows:—She had never been very robust, and was always rather retiring and backward. She had suffered from epilepsy since the age of 14, the fits, however, recurring at long intervals until the last year, when they had been more frequent. She had had attacks of pain, similar to that for which she sought advice, regularly every four weeks for the previous six months, and at irregular intervals for about one year before this. The attacks of pain lasted about one week and had been getting more severe. In the intervals she was not quite free from pain, but was able to carry on her ordinary household duties. The epileptic fits in recent months had only occurred when she had these attacks of pain. She had never menstruated.

State on Examination.—For her age the patient was short, somewhat anæmic, and generally poorly developed, both mentally and physically. The mammae were small. The abdomen was slightly distended and very tender on palpation, but no supra-pubic swelling was to be felt, as from the history of the case I had expected. The temperature was 100° F. and the pulse 98. Her expression was anxious and indicative of severe suffering. The external genitals were normal, with abundance of pubic hair. There was no ostium vaginae, and no suggestion of any hymen. On passing a catheter into the bladder and introducing a finger into the rectum only a very thin partition seemed to separate the two as far up as the finger could reach. Subsequently under anæsthesia the rectal finger could feel very high up a somewhat diffuse flaccid swelling, which I took to be retained menstrual blood in a cul-de-sac in the upper part of the vagina below the

cervix uteri. The uterus was felt to be small, and no dilatation of the tubes was to be made out.

Some days later, when the acute pain had subsided, by careful dissection between the rectum and the urethra I tried to reach this swelling in order to make an artificial vagina and so drain away what I supposed to be retained menstrual blood in a vaginal cul-de-sac, and to provide at the same time a channel for the escape of subsequent menstrual discharge. At the time of the operation I thought I had succeeded in doing this, but I am now doubtful. The swelling was, as I have stated, not very large and very flaccid, and the venous hæmorrhage during the dissection was very severe. I packed this canal with gauze and subsequently put in a long glass drain.

Exactly four weeks later there was a recurrence of the severe abdominal pain, and once again the swelling, which meantime had disappeared, was felt on rectal examination. During this attack the girl had two severe epileptic fits.

On the 4th day I opened the abdomen, for I was now of opinion that the swelling felt per rectum must be a distended uterus or tube, though its softness seemed to contra-indicate this, but if so I decided to remove either or both.

The peritoneal cavity contained a considerable quantity of dark fluid blood. It presented in fact the appearance one finds in slight rupture of a tubal gestation. The blood, however, was not clotted. The pelvis was full of blood, and it was the bulging of the pouch of Douglas which formed the soft diffuse swelling to be felt on rectal examination. How much blood was contained in the peritoneal cavity it is difficult to say, but 4 to 6 ozs. would, I think, be a moderate estimate. There were no adhesions and no signs of any organisation or consolidation of the blood, which was of the same dark colour and consistence as one finds in hæmatocolpos, the result of imperforate hymen.

The deep staining of the peritoneum as well as the amount of blood which was present would lead me to suppose that it was not all at least of recent origin.

The uterus was normal but felt slightly distended, and the right Fallopian tube was short, straight, and moderately distended with dark blood, which was oozing from its fimbriated end. On compressing the uterus, and what I took to be a cul-de-sac of the upper part of the vagina, I forced a considerable quantity of blood along this tube into the peritoneal cavity. The left tube was normal and contained no blood.

It seemed, therefore, that there was present a patent right Fallopian tube, and that the menstrual blood at each period had regurgitated along it into the peritoneal cavity and that this regurgitation of blood was the cause of the severe abdominal pain and tenderness which had recurred every four weeks during the previous six months.

As the uterus, tube, and ovaries were normal, excepting this patency of the right tube, I thought it right to make yet another attempt to establish a communication from below with the uterus, I accordingly waited for another menstrual period, and once again I made, unsuccessfully, an attempt to do this, and was compelled again to do an abdominal section during an attack of pain similar to the others. On this second occasion I found conditions exactly as before—blood in the peritoneum oozing from the right tube and the uterus slightly distended but capable of being emptied by compressing it, when its contents escaped from the fimbriated end of the right tube.

I would have removed the uterus but the patient was taking the anæsthetic very badly, so I removed both ovaries instead as being the quicker operation. I thought this would stop menstruation, and I considered also that the removal of the ovaries might possibly have some beneficial effect on the epileptic fits, which, as stated, seemed to be more or less menstrual in the time of their occurrence.

The recovery from this operation was uneventful, and the patient was on the point of being discharged when again on 3rd February, one month after the oöphorectomy, she began to complain of abdominal pain and pain in the back, which gradually became so intense that it was only by large doses of morphia she could get any sleep at all. The temperature also began to rise and the pulse got rapid.

On rectal examination a very tense painful swelling, quite different from that noticed on previous occasions, could be felt and palpated bimanually.

The swelling was in the middle line and felt like a distended uterus, though in view of the former operation, when both ovaries were removed, this seemed hardly likely.

Five days after the onset of the pain her condition was so serious that after consultation with my colleague, Dr. Lackie, who had seen the case from the beginning along with me, I was reluctantly compelled to do a third abdominal section.

On this occasion there was no blood in the peritoneal cavity,

but the uterus, which formerly was small, was now distended to about the size of 2½ months' pregnancy and formed a tense globular tumour in the pelvis. Before I could remove it I had to incise the fundus, when a large quantity of dark blood and muco-purulent fluid escaped. This allowed the uterus to collapse, and its removal was then easily accomplished. The amputation was done low down below the level of the internal os, but the cervical canal was also distended, the section of the uterus at this level passing through a dilated canal which easily admitted the forefinger. There seemed to be no vaginal cul-de-sac below this, and I am inclined to think that what I had considered to be vagina in the first and second abdominal operations was the dilated cervix. It has been noted frequently before in cases of atresia that the uterus becomes gradually dilated from below upwards. Before closing this dilated cervix and covering it over with peritoneum in the usual way I carried a drainage tube from above downwards to the perineal region. The patient made a somewhat tedious recovery, but ultimately left the hospital quite well and has remained so since.

The special points of interest in this comparatively rare case of absence of the vagina are—1st, the regurgitation of the menstrual blood along the Fallopian tube directly into the peritoneal cavity; 2nd, the continuance of menstruation after complete removal of both ovaries.

There is an extensive literature in connection with this subject of atresia and of absence of the vagina, and many recorded cases, but I have been unable to find any one exactly similar to my own. Cases of retention of menses, in which free blood has been found in the peritoneal cavity, have been recorded by Meyer in 1896, by Landau and Rheinstein in 1892, and Säger in 1896, and more recently by Russell Andrews in 1911, but in all these there was marked haematometron or marked distension of the tubes. In my case neither was present.

From the history and from what I saw at the first two abdominal operations, I think there can be no doubt that the severe attacks of pain from which the patient suffered were due to the escape of menstrual blood along the right Fallopian tube into the peritoneal cavity. The absence of any shock may be accounted for by the small amount of blood which would escape at any one time and its gradual accumulation in the peritoneum during the menstrual period. Abdominal tenderness and rapidity of the pulse I have noted were always present during

the attacks and gradually subsided in the interval. Abdominal pain and tenderness as symptoms of intraperitoneal bleeding we are familiar with in early rupture of a tubal gestation and in cases of secondary hæmorrhage following abdominal operations.

In this connection I may refer to an interesting case which was reported to me by Dr. Thin. The patient was a young lady who previously had been quite strong and whose menstruation had always been normal. One day last winter, towards the end of a period, she was seized with acute abdominal pain, with great abdominal tenderness suggesting appendicitis, for which she underwent an immediate operation. The appendix was found to be normal, but there was a considerable quantity of blood in the lower abdomen, which was found to be oozing from the right Fallopian tube. The diagnosis of a patent Fallopian tube was made. The two succeeding periods were attended by pretty severe pain, but since then there has been no more than the ordinary discomfort. The Fallopian tube was not removed.

May it not be possible that some of the very severe cases of dysmenorrhœa one occasionally comes across, where on examination everything seems to be normal, are due to a similar cause, or, if not to regurgitation of blood through the tube, then to an abnormal amount of blood getting into the peritoneum from the rupture of an unusually vascular Graafian follicle. I have repeatedly in abdominal work been surprised to find a considerable amount of blood in the pouch of Douglas. In these cases it has been noted that menstruation had just terminated.

Blood effused into the peritoneal cavity seems to undergo a very rapid and complete absorption, leaving no trace of adhesions as one would expect.

I had occasion recently to do an abdominal section in a woman on whom I had operated four years previously for a ruptured tubal gestation. At the first operation there was a large quantity of old blood-clot adherent to the pelvic and abdominal viscera, and much recent blood which, owing to the condition of the patient, I could not remove. At the second operation there were but a few slight adhesions on the side of the gestation, but the rest of the peritoneum in the pelvis was perfectly normal, and there were no intestinal adhesions at all.

In this case of atresia there were no peritoneal adhesions, though I believe this menstrual regurgitation had been going on for months. One would expect, of course, to find a more complete absorption of menstrual blood than blood from other

sources, as it does not clot, but I believe, no matter what its origin, it is in time completely absorbed.

The patulous condition of the interstitial part of the tube, which permitted the regurgitation of blood in my case, must be regarded as accidental and in no way the result of the absence of the vagina. In cases of obstruction to the outflow of the menstrual blood from the vagina, the rule is for the genital tract to be slowly distended from below upwards. First the vagina, if any is present; next the cervix, and next, and as a rule finally, the cavity of the body of the uterus.

It is the exception for the tubes in such cases to become distended. Where hæmatosalpinx is found associated with hæmatometron the uterine orifice of the tube is generally found closed. The blood in the tube, moreover, in such cases is often found in different loculi, suggesting some other source of the blood than an outflow from the distended uterus. This is in accordance with what one would expect, as under normal conditions the uterine orifices of the tubes will not permit of regurgitation of fluids, except under great pressure, and a patulous tube orifice is very rare.

The history of the case after removal of the appendages is interesting, though what really followed the ligature of the tube should perhaps have been foreseen. That menstruation does not *always* stop at once after removal of the ovaries must be a common experience—so common that I think it is not necessary to postulate the presence of an accessory ovary, or that some part of ovarian tissue has been left behind, to explain such cases.

This being so, it was undoubtedly a mistake on my part to remove the appendages only when I had not provided any channel for the escape of a possible recurrence of the menstrual discharge.

The reasons which prompted this procedure at the time of the operation I have already stated. What is of special interest was the acute distension of the uterus which was produced by the menstrual discharge of one single period. The uterus was certainly twice its normal breadth and was also considerably elongated, and the great tension of the retained fluid was shown by the spurt of blood which took place when the uterus was incised.

The presence of fairly well-developed uterus tubes and ovaries with complete absence of the vagina constitutes a third point of interest, which I merely mention in conclusion.

Vineberg, who has written on the subject, says that from a study of the recorded cases, "it can be correctly deduced that there is a vagina, no matter how rudimentary, about the cervix when a fairly well-developed uterus is present; true absence of the vagina occurring only when there is practically an absence of the uterus." So far as I was able to judge there was no trace of a vagina in my case, and the great distension of the uterus which followed after the ligature of the tube, as a result of one menstrual period, proves, I think, that there could have been no sac below into which the blood could have escaped. There was certainly no accumulation of blood in or below the uterus at the termination of the operation when the ovaries were removed.

I had sections made from the tube and uterus. Dr. Watson reports that they call for no special note.

My colleague, Dr. Lackie, saw the patient throughout along with me, and I gratefully acknowledge his advice and assistance in connection with her long illness.

THE CARE OF THE TEETH IN RELATION TO THE HEALTH OF CHILDREN AT THE SCHOOL AGES—THE PROVISION OF SPECIAL SCHOOL DENTAL CLINICS.

By L. STORROW SHENNAN, L.D.S. Edin., D.D.S. Penna.

THE longer one practises as a dentist the more one realises that much of the caries which is so common both in the young and in the old, and the diseases consequent upon it, are preventible. I have realised this to the full in the course of my ordinary private practice, and latterly have been interesting myself more particularly in the care and regulation of the teeth of young children. Eighteen months ago this interest was deepened when I was afforded an opportunity of gaining a more extended experience of this kind of practice on my appointment as School Dentist to the Carnegie Dunfermline Trust. I shall give you some details of this special work later, but in the first place I should like to refer to the means provided in this and other countries for dealing with the evils of dental caries during the school ages.

In Russia, as early as 1879, attention began to be drawn to the necessity for care of the teeth of school children. In that year Professor Sklifosovosky examined 400 school children in St. Petersburg and found that 72 per cent. of these had carious

teeth. In 1882 Dr. Palmovitz examined students in one of the towns of Finland and found that 45 per cent. required actual treatment. He concluded that the children of the wealthy suffer more from caries than do those of the poorer classes.

Subsequently distinct advances were made, and in 1896 a Commission was appointed by the Society of Russian Dentists. Professor Limberg was chairman, and the Commission decided that—(1) It is necessary and compulsory that children's teeth be examined, and admission to the schools granted only to those with teeth naturally healthy, or rendered so by appropriate fillings. (2) To eradicate disease every school should have a dentist to examine the children's teeth twice a year, and to give them the necessary treatment.

In the military schools comfortable dental offices have been fitted up, and the dental officers are required to take care of the mouths of the pupils, and to use prophylactic measures; to accustom the children to daily care of the teeth; to keep a detailed record, with observations, as to results obtained; and to present a report on expenses and on materials used.

In Germany also it is a considerable time since the first attempt was made to educate the public as to the relation between dental hygiene and general health.

In 1861 the Central Committee of German Dentists offered a prize for the best work upon this subject. This was awarded to Suersen in 1864.

In Strasburg, in 1902, after seven years' agitation, Dr. Jessen obtained permission to establish a municipal school clinic. A sum of money was voted for the purpose, and this clinic is now worked under the best conditions. The inspections are made at the schools, and the pupils are sent under the supervision of the teaching staff to the clinic, chiefly out of school hours, though when the condition of the teeth is very bad, pupils are allowed to attend during the school hours, but only two from the same class at one time. Attention to the teeth of children between the ages of three and six is compulsory. Pupils with bad teeth are not allowed into the vacation colonies (holiday camps), and they are not allowed to attend school if they refuse to have their teeth attended to. Tooth brushes are provided for children by the school management, and the school dentist demonstrates how to use them. Lectures are given to teachers, and conferences are held to which parents are invited.

Upon the inspection charts which are sent to the parents of

the children requiring attention the following "rules of dental hygiene" are printed. The child brings this chart each time he attends the clinic.

- "1. At the age of $2\frac{1}{2}$ years children have 20 teeth.
2. At the age of 6 years the first permanent teeth erupt on the surface of the mouth—first molar.
3. From 7 to 14 years replacement of the teeth goes on.
4. At the age of 12 years the second large molars erupt—at the age of 18 years to 40 years the third molars or wisdom.
5. Good teeth are indispensable for the health of the stomach and the whole body.
6. The milk teeth are more important in the child than the permanent are in the adult.
7. Healthy milk teeth ensure good permanent teeth.
8. From the earliest possible age the teeth should be brushed twice a day—in the morning, and especially at night.
9. From 3 years it is necessary to have the teeth examined every six months by a dentist.
10. When the teeth decay they should be filled before they cause pain.
11. The mouth, which is the entrance into the body, ought to be kept completely healthy.
12. In order to keep a healthy mouth it is necessary that all roots be extracted when they cannot be filled.
13. To masticate well is to digest well—that is the chief reason for taking care of your teeth."

The result of this work is seen in the report of the inspector of the Strasburg schools. This report states that instead of the schools suffering, it has been found that the children actually lose less time in undergoing treatment than in remaining away from school while suffering from toothache. Increased strength—physical, intellectual, and moral—is evident, and therefore the interests of the schools themselves benefit. Many other towns in Germany have followed the example thus set by Strasburg, and at the present day there are 119 school dental clinics in Germany.

In France less has been done than in either Russia or Germany. Up to 1908 no attempt was made to introduce dental hygiene in the communal schools. As a matter of fact an existing law prohibits a dentist from entering the precincts of the school. Apart from the teachers, only inspectors, cantonal delegates, and doctors can enter it. It is thus only by courtesy that a dentist is allowed

to make inspection of the mouths of children attending these schools, and this is carried out only to a limited extent in some of the colleges and higher primary schools. The fault lies a good deal with the dental profession in France, who do not show sufficient energy in advancing their claims.

In the normal schools and boarding schools supported by the State a dental service has been organised. Two dentists are nominated—one to inspect, and the other to operate. The pupils are examined twice a year, and charts indicating any necessary treatment are sent to their parents, who take the child for treatment to their own dentist, so that the principal advance made in France is the establishment of the obligatory dental inspection and chart. Latterly, dental services have been organised in connection with the public relief board. Attendance is given twice a week, though in the hospitals urgent cases receive attention immediately.

As remarked by Mlle. Sommers, "All these innovations are useful, but they are not sufficient to check dental caries on a national basis. In order to render the teeth of the whole community healthy, and to raise the general standard of health, it is necessary to institute school dental clinics."

In Sweden Dr. Forberg, by his indefatigable zeal, soon brought the importance of dental hygiene to the knowledge of his fellow-countrymen, and in association with the Swedish Dentists' Society prompt steps were taken.

In 1896 this society appointed a committee, which examined dentally 18,000 school children. The condition of affairs revealed was so serious that conferences were held in the primary schools and in the colleges of the capital; lectures were organised for children, parents, and teachers; large money prizes were offered for the best books dealing with the teeth and oral hygiene; statistics of dental caries were shown at a health exhibition held at Stockholm, and the public journals interested themselves in the question, and insisted that the State should intervene. In 1905 the Parliament took up the question, and soon Stockholm had its school dental clinics.

In Switzerland at the Polyclinic at Lucerne there is a dental department in which all school children without distinction are cared for.

In Belgium two dentists are employed by the town of Brussels. The treatment is absolutely free. The communal schools alone benefit from this service. The number of pupils attending these

schools is 12,000. The teaching staff assists the work by lecturing to the children on hygienic care of the teeth and mouth, and the children are required to make abstracts of these lectures in writing. At Antwerp also there is a municipal clinic at which dental services are given free.

In Canada the Education Act was amended in Nova Scotia in 1907 so as to provide for periodic and systematic examination of the teeth of children. The dentists examine without charging for their services. There are no school clinics, and the poorer children receive treatment at the dispensaries and dental colleges.

In Australia supervision of the teeth of school children is just being brought to the attention of the public. In South Australia a paid dentist attends to the wards and neglected children of the State. The medical officer is at present engaged upon the examination of the school children, this including inspection of their teeth. The Odontological Society of Queensland has approached Government upon the question and have received a favourable reply.

In England the British Dental Association in 1901 appointed a Commission, which examined 10,500 children, of whom 86 per cent. required treatment. A pamphlet was published by the association and distributed to the public. The association also approached the Government with regard to the organisation of obligatory inspection. Dental inspection of children attending public elementary schools is now compulsory in England and Wales, and the question of treatment is being considered by school authorities. Dental appointments have been made by many Poor Law schools, orphanages, and benevolent institutions. In the majority of public schools their administrators arrange for dental attendance on the pupils.

At Cambridge the first school dental clinic was established in the year 1907. It was begun as a private scheme, but has now been taken over by the municipality. Elementary school children are treated free of charge. The clinic is well organised, and everything is done to encourage the children to attend. For extractions a room is placed at the disposal of the school dentist in a hospital, the fillings and other treatment being carried out at the clinic itself.

At Norwich the Board of Education furnishes dental aid to children attending the public elementary schools. The cost of this scheme is not in any case to exceed the proceeds of a farthing rate, and this sanction is limited to two years.

London.—At Bromley a clinic was established in January of this year, restricted to children between the ages of six and eight years. A fee of sixpence per attendance for treatment is paid by the parents, while no charge is made for inspection.

At Deptford there is a clinic subsidised by the London County Council. A small fee, I understand, is paid for dental treatment.

In the Brixton, South London, clinic Mr. Breese has done exceptionally good work, and is most enthusiastic with regard to it. The clinic was financed privately, and no reasonable expense was grudged. The work was begun in January 1910, and children attend on two days a week after school hours.

To come to Scotland. Mr. Fisher of Dundee has for years advocated at the meetings of the British Dental Association the care of the teeth of children of school ages.

In Dunfermline the Medical Clinic of the Carnegie Trust has been in operation for several years, and the institution of a dental clinic was first advocated by the former medical officer of the Trust — Dr. Bridge — who had become convinced, during the medical inspection of the school children, that attention to oral hygiene was absolutely necessary for the general health of the children. The Carnegie Trust was thus the first to establish a public school dental clinic in Scotland. At first there was much scepticism as to the success of such an institution, but this has been completely falsified by the results.

The clinic was started in September 1910, two apartments, a surgery and a waiting-room, being provided in the old baths. At the present time plans have been passed for a special building to house both the medical and dental clinics.

The present surgery is fitted out with the most modern appliances, so that the work is facilitated in every way. In the waiting-room illustrated papers were supplied at first, but were so quickly destroyed by the children that they were discontinued, and toys of various kinds were substituted.

I have been assisted by two trained nurses of the general medical clinic, and a lady secretary. The presence of the nurses gives confidence to the children, as they get to know them at the school medical inspection and at the medical clinic. The secretary makes all appointments, enters operations, makes arrangements for inspection at the different schools, and sends lists with the names of pupils expected each day to the headmasters and headmistresses.

I give 12 hours or 3 days of 4 hours each per week to the work.

Systematic inspections are restricted to the children of ages from five to ten in the primary departments. The reason for this is that one can then watch the results of treatment as time goes on and as the child progresses in its studies from year to year. Notes of treatment required are entered upon charts, and notification circulars are sent to parents or guardians to intimate the hour at which the children are expected. Moreover, the notification forms are useful, because they give the authority of the parents to do what one thinks necessary, and they have even proved of value when parents interfere with the treatment proposed. If anæsthetics are required for extractions, a special form is sent out.

There is no lack of material, as the following table shows:—

ATTENDANCES AT THE CLINIC FROM AUGUST TO DECEMBER 1911
—TOTAL, 1834.

	Boys.	Girls.	Total.
August	85	113	198
September	203	344	547
October	139	171	310
November	176	266	442
December	136	201	337
	<u>739</u>	<u>1095</u>	<u>1834</u>

In analysing the total attendances I find there were—

21 at the age of 4 years.		
158	„	5 „
315	„	6 „
314	„	7 „
244	„	8 „
224	„	9 „
148	„	10 „
155	„	11 „
110	„	12 „
100	„	13 „
14	„	14 „
2	„	15 „
29 age not specified.		

Hence most attendances were given by children between the ages of 6 and 9 years.

METHODS OF CONTENDING WITH DENTAL CARIES ON A NATIONAL OR MUNICIPAL BASIS.

The evil is thus recognised. How is it to be attacked? The Education Act imposes the duty of inspection of the teeth upon local authorities, leaving treatment optional. Some advocate the establishment of a State Dental Service, and maintain that it would not be detrimental to the profession for the following reasons:—(1) It would provide for a class who never seek the services of the dentist, or when they do so, obtain them at the expense of the dentist at a hospital under the guise of charity. (2) It would provide for those members of the profession who dislike the commercialism of private practice, or who are especially interested in investigation, or, from other cause, prefer the public service. (3) It would educate the public to the need for and importance of skilled dentistry. (4) It would create in the working classes a demand for skilled treatment in the future, and for a service which would be characterised by cleanliness of method and careful manipulation, and impose upon them from their earliest years the need for oral hygiene. Instead of militating against the demand for skilled and modern methods of conservative dentistry, it would strengthen the position of the best type of qualified practitioners.

The establishment of such a service would, however, require to be safeguarded by some scheme founded upon a contributory basis, and this would probably prove an unsurmountable barrier.

In some of the smaller towns in Germany a fee of 1s. per head per annum is charged for each child treated, with a reduction in the case of large families.

The second manner is that which I have been considering for the greater part of my paper—the school dental clinic. These should be established in every centre of elementary education, thus attacking the evil through the children, as representing the coming generation. Children should be submitted to regular compulsory inspection of their mouths, and caries treated as soon as detected. The necessity for cleanliness of the teeth as preventive of caries should be emphasised. This is not difficult, as even young children can be readily taught to use the tooth brush.

The inspection should be carried out by a dentist. In New York it was found that examination by medical officers detected only one-eighth of the defects found by the qualified dentist.

Prevention is much less costly than cure, and, as Mr. J. G.

Turner says, "In a few years the decrease in sickness of dental origin might reasonably be expected to lead to a substantial decrease in poor rates, and to set free for more useful purposes a large amount of charity now used up in attempts to rehabilitate the wrecks of humanity."

THE DIAGNOSIS OF DISEASE OF THE STOMACH BY THE X-RAYS.*

By GEO. A. PIRIE, M.D.,

Hon. Medical Electrician, Dundee Royal Infirmary.

AT a recent medical congress in Germany Professor von Bergmann made this striking statement :—

"The members of the Congress can hardly conceive the progress made from day to day in Röntgen diagnosis, and especially in the diagnosis of diseases of the stomach and bowels. And yet we hear the physician without shame confess that he knows nothing of Röntgen diagnosis."

That statement was made in Germany and no doubt does not apply to this country, but I venture to hope that the recent advances in this branch of diagnosis may be of interest to you, and to suggest that X-ray examination of the alimentary canal may be of great assistance to both physician and surgeon.

It was in 1904 that the first step was taken in the X-ray diagnosis of stomach trouble. Before that year observers could not distinguish the shadow of the stomach on the fluorescent screen. It resembled too closely the shadows cast by other organs in the abdomen; and physicians were doubtful about giving more than 10 grs. of a bismuth salt for fear of poisoning their patients. Then Rieder discovered that 2 ozs. could be given with impunity, and after that quantity had been swallowed in a pudding the shadow of the stomach stood out black among its grey surroundings.

One danger, however, had to be avoided. The *subnitrate* of bismuth was found to be a dangerous salt, not because of the bismuth but because of the acid which gave rise to nitrite poisoning; so the subnitrate has been entirely discarded and either the carbonate or the oxide given instead. Of these salts of bismuth even 6 ozs. have been swallowed without causing the least inconvenience.

* Read before the Forfarshire Medical Association, 10th May 1912.

Rieder's first plan of giving it in a pudding is still the best way. Some observers have given it mixed with milk, but the bismuth separates too readily and falls to the lowest part of the stomach. Our plan in the Dundee Royal Infirmary is to have a pint of boiled bread and milk prepared, fairly thick, with 2 ozs. of bismuth carbonate added, and a little raspberry jam to make it palatable. In this form patients have no objection to take it, and it causes neither sickness nor diarrhoea, if these conditions were not present before.

One precaution should be taken. The stomach should be empty if possible before the bismuth meal is given (otherwise the outline of the stomach is not mapped out as it should be), and the full pint of pudding should be swallowed. Occasionally the patient cannot manage it all, and so only part of the stomach is filled.

Let us suppose that all precautions have been taken. The patient comes fasting about 10 A.M., and, being hungry, sups up all the bismuth meal. He stands with his back to the focus tube while the screen is held in front. A coin is fixed by sticking-plaster over his navel. I usually examine at intervals while the meal is being swallowed. It can be traced down the œsophagus, at first quickly then slowly as it nears the diaphragm, then it slips into the stomach, if no stricture of the œsophagus is present, and collects in a mass at the cardiac end. This mass gradually increases in size, becomes cone-shaped, with the point downwards. Then the shadow is seen to extend downwards to the level of the umbilicus and curve round to the right, crossing the middle line just below the umbilicus, then passing upwards an inch or so. When all the meal has been taken the stomach appears J-shaped. Occasionally a normal stomach may be seen horn-shaped and lying well above the umbilicus, and at times the physiology text-book appearance of the stomach may be seen, but this is very rare.

After the meal has all been taken and the stomach is filled in every part, peristaltic movements can be seen. A depression appears in the greater curvature half-way between cardia and pylorus. It moves down and round the greater curvature at the rate of 1 inch a second, getting deeper and more marked as it proceeds, while a similar depression can be observed just opposite on the lesser curvature. Sometimes these depressions are so deep that they seem to cut the stomach in two. They move towards the pylorus and end there. Meantime a small shadow can be seen.

forming, as it were, a cap over the pylorus. There are no peristaltic waves in it, and presently it vanishes. That is the first part of the duodenum. Occasionally the second and third parts can be seen, but rarely in a normal patient. By the time the first peristaltic wave has run its course, a second has formed, and sometimes a third, and these waves may be seen following each other round the greater curvature. One curious observation has recently been made. These peristaltic waves are not always of equal vigour. Once every five or ten seconds they appear to wane—the outline of the stomach is almost smooth—the pyloric shadow falls downwards and away from the duodenal cap. Then gradually the waves recover their energy and become vigorous as before. This has been called the systole and diastole of the stomach.

Within half an hour much of the bismuth meal has been passed out of the stomach. Its presence cannot be detected in the jejunum, but in the ileum (which lies just above the pelvis) the shadow can be easily detected, and in $4\frac{1}{2}$ hours the caecum gets filled up. By this time the stomach should be empty. I usually allow 6 hours to elapse before the second examination, and by that time every normal stomach should be clear of the bismuth meal. To complete the subject I may add that within 24 hours the bismuth shadow should be observed in the descending colon and rectum. Such is the appearance presented by a *normal case*.

Some varieties of shape and position may be noticed in stomachs apparently normal in function. While the cardiac end is always situated just under the left arch of the diaphragm, the greater curvature may be two inches above the level of the umbilicus, or as far below, and the pylorus varies a little in position too, though it usually lies just to the right and above the umbilicus.

The peristaltic action may be feeble or vigorous; only one wave present at a time, or three, four, or more, but as a rule there are two waves visible at a time, the one just passing off as the other is beginning.

Now let me take some typical examples of abnormal stomachs.

I. *The Atonic Variety*.—As soon as the bismuth enters the stomach its shadow may be seen to pass down to the pelvic region, succeeding mouthfuls collect there as in a bag, forming a semilunar shadow. There is no attempt made by the stomach to grip the food at the cardiac end, and as a rule the peristaltic action is feeble.

Six hours later the stomach still contains much of the meal, lying like a half moon above the pubes.

II. *The True Hour-Glass Stomach*.—The bismuth is kept at the cardiac end and its volume increases, forming a spherical or oval mass. There is no appearance of the shadow extending down to the level of the umbilicus, or anywhere else, for some time. Peristaltic movements soon begin and may be very vigorous—an unusual thing at the cardiac end. Later there may even be antiperistalsis, the waves passing upwards instead of downwards.

After an hour or so a shadow may be seen forming below the umbilicus or to its right side. Occasionally a thin dark streak may be seen to connect both shadows.

After 6 hours the hour-glass appearance may still be visible.

Such a result points conclusively to cicatricial contraction following gastric ulcer.

III. *Spasmodic Hour-Glass Stomach*.—This is apt to be confused with the true hour-glass stomach at first, for its appearance is somewhat similar. The bismuth is held up in the cardiac end, it passes slowly into the pyloric end, and the hour-glass shape persists for some time. But there are points of difference. The lower segment of the stomach fills soon after the upper; sometimes massage of the abdominal wall will relax the spasm and restore the normal outline of the stomach. It is said that the injection of atropin has the same effect.

Such is spasmodic hour-glass stomach, caused usually by a small ulcer on the lesser curvature, though at times it appears to be reflex from appendix or liver disease.

IV. *Pyloric Obstruction*.—The presence of this condition is easily inferred from the X-ray appearances.

If the obstruction is recent and the stomach retains its muscular power, the peristaltic movements are seen to be excessive, each wave cutting the stomach in two; and yet after six hours there is a considerable residue of bismuth in the stomach.

If the obstruction is chronic and the stomach has lost its tone, the appearance is somewhat different. The bismuth shadow is seen low in the pelvis; peristalsis is feeble and soon over; but here also there is much residue in the stomach 6 hours later.

In either case the examination does not decide the cause of the obstruction, whether spasmodic, cicatricial, or due to tumour. A very careful examination of the pylorus as the peristaltic waves reach it may assist in deciding the question.

V. *Carcinoma of the Stomach*.—This alters the shape of the

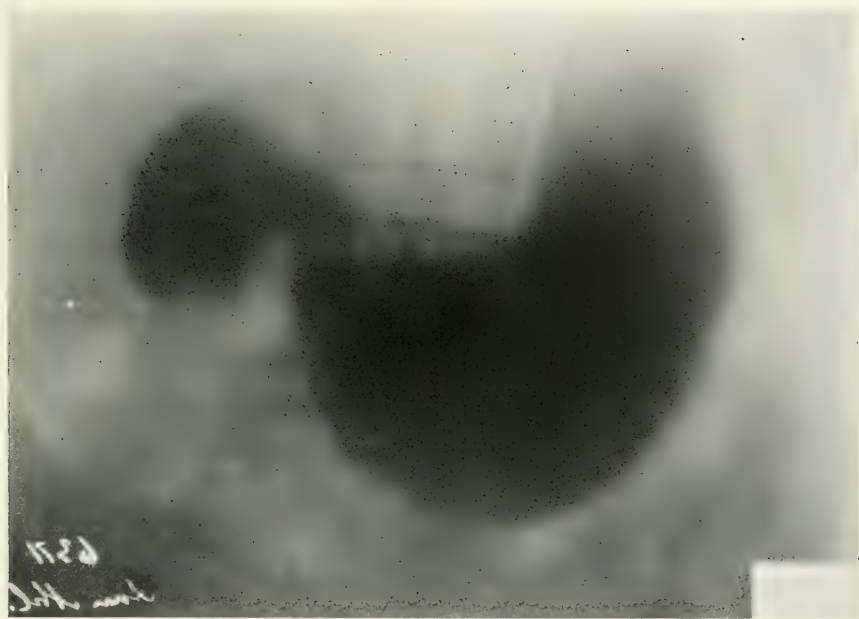


FIG. 1.—OBSTRUCTION IN THIRD PART OF DUODENUM CAUSING DISTENSION.



FIG. 2.—CARCINOMA OF STOMACH INVOLVING GREATER CURVATURE.

stomach as seen by the X-rays. There may be a bite out of the greater curvature which no massage or respiratory movement can alter; or an encroachment on the lesser curvature which is fixed in position; or the pyloric end may show an unusual outline unaffected by peristalsis. Here also if a bismuth cachet enclosed in gut be given, it remains visible for many hours, owing to absence of HCl in the gastric juice.

VI. *Obstruction in the Duodenum.*—As a rule, only the first part of the duodenum can be observed by the X-rays, and it appears like a cap over the pylorus. But occasionally that shadow may be seen to enlarge and spread to the right and down and then to the left like a horse shoe. There is no peristalsis, but after every wave from the stomach this shadow gets larger. It is usually due to a kink at the point where duodenum joins jejunum, or to a cicatrix following duodenal ulcer.

One is tempted to continue this subject into all the varieties of intestinal stasis, including appendicitis and organic stricture, for the same bismuth meal, given to show the condition of the stomach, will also in course of a few hours show the shape and position of ileum and colon and the rate of passage of material through these parts of the alimentary canal.

Mr. Arbuthnot Lane has recently opened up a wide field of surgical work by short-circuiting the colon in the treatment of the most diverse diseases. He says:*

“The actual existence of chronic intestinal stasis can be demonstrated beyond question and gauged accurately by giving the individual a sufficient quantity of bismuth carbonate and by watching its rate of progress through the several portions of the gastro-intestinal tract.” And he adds: “The X-ray affords invaluable evidence for differential diagnosis.”

Now, in conclusion, permit me to make a few dogmatic statements without mentioning any exceptions or modifications—

1. A stomach that allows food to pass at once to its lowest point and gather there is atonic. Its greater curvature requires elevation by mechanical or surgical means.

2. A stomach that is not empty in 6 hours has some obstruction at the pylorus. Gastro-enterostomy is indicated. But if that stomach is also atonic, gastro-enterostomy alone will do no good.

3. If a functional hour-glass appearance is observed, the stomach has a small ulcer somewhere.

4. If a true hour-glass appearance is seen, gastro-enterostomy must be done *above* the level of the constriction.

5. If the gastric juice contains no acid (as shown by the bismuth cachet remaining undissolved), and there is the slightest irregularity of the stomach outline, carcinoma is present.

6. Lastly, if indigestion resists medical and dietetic treatment for more than a month, an X-ray examination after a bismuth meal should be made. It is painless, not unpleasant, and capable of supplying important information about the stomach—its shape, and position, and functional activity.

CLINICAL RECORDS.

LARGE SLOUGHING FIBRO-CELLULAR TUMOUR OF THE UTERUS IN A VIRGIN AGED SIXTY-EIGHT REMOVED PER VAGINAM BY MORCELLEMENT.

By JAMES OLIVER, M.D., F.R.S.(Edin.),
Physician to the Hospital for Women, London.

Miss T., aged 68, was sent to me by Dr. W. E. Black of East Finchley with the following history:—Menstruation ceased abruptly 18 years



FIG. 1.

ago. For 12 months patient has complained on and off of pain, which has never, however, been severe, in the left iliac region, and for 5

months she has observed that her underclothing has been almost invariably more or less stained by a brownish discharge, which has greatly increased in amount and become offensive during the last 5 weeks. For 3 days she has been unable to pass urine, and the bladder has had to be emptied daily by the catheter.

Physical Signs.—The hypogastrium is occupied by a small globular swelling, measuring vertically and transversely about 4 ins. I gradually dilated the orifice of the hymen with my forefinger and learnt thereby that the vagina was enormously dilated by a sloughing growth which was continuous with the hypogastric swelling. The tumour altogether appeared to be of about the size of a full-grown foetal head, and Fig. 1 depicts approximately the condition of affairs as they must have been. The cervix could not be reached, nor was it defined at any time during the operation. The patient was already sapræmic, with a temperature of 103° F. and a pulse of 100. As it was quite evident that removal of the growth per vaginam by morcellement was the only possible procedure, I performed this operation.

Operation.—The vaginal orifice was stretched to its limit, but being so sodden by the continuous 5 weeks' discharge it was deeply torn here and there by the stretching. The vaginal canal was then protected by 4 retractors about $\frac{1}{2}$ of an inch wide. With strong narrow volsellum forceps and a pair of strong scissors removal of the tumour, which weighed about 2 lbs., was eventually accomplished by morcellement. The tumour possessed no capsule, and the dense fibres were so incorporated with the posterior wall of the uterus that the peritoneum was opened and the entire uterus had to be removed. The tumour was composed of connective tissue, the bundles of which had no regular arrangement, and many of the bundles encountered were as dense and glistening as the connective tissue found in tendons or fasciæ.

The patient convalesced well.

THREE CASES OF HERNIA—INGUINAL, VENTRAL, AND UMBILICAL.

By GEORGE L. CHIENE, M.B., F.R.C.S.,
Assistant-Surgeon, Royal Infirmary.

THE following three cases have all some special features of interest, and are therefore, I think, worthy of record:—

INGUINAL HERNIA, CONTAINING DIVERTICULUM OF BLADDER.

M. R., æt. 80, was admitted to the Edinburgh Royal Infirmary in February of 1910 suffering from strangulated inguinal hernia. For five years previous to admission he had suffered from hernia and had

worn a truss, which, however, had not been very effective. On the evening before admission patient was sitting at the fire, when he was suddenly seized with severe pain in the left inguinal region. He did not send for his doctor owing to the lateness of the hour, but was seen by him early the next morning. Strangulation of the old-standing hernia was diagnosed, and an anæsthetic having been given, an unsuccessful attempt was made to reduce the swelling. Towards afternoon the patient vomited, and was then sent to the Royal Infirmary, where he arrived about 6 P.M. On admission he complained of great pain in the left side of the scrotum, and on examination a large tense scrotal hernia was found to be present. This was dull on percussion, and there was no impulse on coughing, the slightest attempt at taxis causing great pain. The resident surgeon (Dr. R. C. Alexander), while making his examination, noted a slight dribbling of urine, and on questioning the patient the fact was elicited that only a small quantity of urine had been passed since the previous evening. The patient further stated that when he required to make water he had noticed for some time past that the rupture became tense and that he could not reduce it, but that after passing water the tenseness disappeared and the swelling was easily reduced. Involvement of the bladder was suspected, a catheter was passed, and about 4 ounces of blood-stained urine drawn off. This, however, had no effect on the scrotal swelling, and it was decided to operate at once. The sac, after being exposed, was opened towards its outer aspect: no bowel or omentum was found, but a small quantity of blood stained fluid escaped. There still remained a large tense ovoid swelling lying internally, which was recognised to be a portion of the bladder, confirming the provisional diagnosis. The sac was freed up to the internal ring, ligatured at its neck, the surplus cut off, and the stump allowed to drop back into the abdominal cavity. A catheter was then passed with the view of emptying the herniated distended portion of the bladder, but this and an attempt to express the contents both failed, partly owing to the acute angle at which the strangulated portion lay in relation to the bladder, and partly to the congestion at the constriction (Fig. 1). The distended cul-de sac of the bladder was then deliberately incised, the contents evacuated, and the opening closed. It was then possible to reduce the prolapsed portion of bladder, after which the inguinal canal was closed without drainage. During the week following the operation the urine was drawn off at regular intervals, to prevent over-distension of the bladder. The patient left hospital three weeks after admission, and has since remained well, having complete control of his bladder. The points of special interest in the case are:—(1) That the symptoms were partly, if not entirely, due to the strangulation of the prolapsed portion of the bladder, as no contents were found in the sac proper, although some blood-stained fluid was

seen in the cavity when the sac was opened. It must be remembered, however, that taxis had been performed when the patient was under an anæsthetic prior to his admission to hospital, and it is possible that the contents may have been reduced at that time. (2) That the prolapsed portion of bladder had evidently been in that position for some considerable time, although it had never given rise to acute symptoms until the day previous to admission. (3) That the history and symptoms made it possible to diagnose involvement of the urinary bladder before the operation commenced. Numerous cases have been operated on in which the bladder has been involved in inguinal hernia, but the condition can rarely be diagnosed prior to operation. Moynihan, in the *Arris and Gale Lectures* (1900), states, "the number of cases that have been diagnosed before operation does not amount, at a

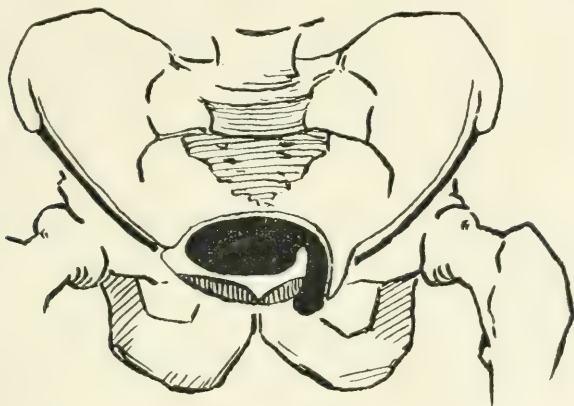


FIG. 1.

To illustrate condition found in Case I. Section of bladder with herniated portion shaded black. Prolongation of peritoneum seen to the left.

generous estimate, to more than 5 per cent. of the whole." From a study of the literature I think that 5 per cent. is a very generous estimate, and one has to take into consideration the fact that there are probably many cases in which the bladder is injured that are never published, and therefore not included in the statistics. Farquhar Curtis, in a paper read before the New York Surgical Society, says: "Important as it is to be able to recognise the bladder before the operation, the diagnosis will rarely be made so early." Very often the condition is not diagnosed until the bladder has been unintentionally wounded, and sometimes not even then. It is further of interest that, notwithstanding the fact that one was prepared to find the bladder forming a part of the hernia, it was found necessary deliberately to incise the prolapsed portion before it could be emptied and reduced. The case was one of oblique inguinal hernia, and con-

formed to the second form of cystocele, originally described as para-peritoneal by Jaboulay and Villard.

In relation to this case a somewhat similar one reported by Major Niblock (*Indian Medical Gazette*, October 1910) is of interest, although the symptoms were not so marked:—"The patient was admitted for left strangulated inguinal hernia. During the preparation for operation the tumour and all the symptoms of strangulation disappeared without any local manipulation, and the patient recovered. Five days later I operated on him for radical cure, and discovered that in addition to small intestine a part of the urinary bladder was present in the sac.

"On questioning the ward-boy who had prepared him for operation on his admission, he said that whilst being prepared the patient passed a large quantity of urine, and expressed himself as feeling much relieved. In this case it would appear that the trouble was due to the herniated portion of the bladder being over-full and causing pressure on the intestinal loop sufficient to give rise to symptoms of strangulation, and that as soon as the pressure was relieved the symptoms disappeared. The patient was an ignorant coolie, and could give no definite history regarding the strangulation."

VENTRAL HERNIA, WITH SUDDEN PROTRUSION OF INTESTINE.

This patient, admitted October 1908, was a single woman, *æt.* 33, who had been operated on 2½ years previously by a gynecologist for some tubal or ovarian condition. For six months previous to admission she had noticed a bulging in the scar of the old operation, and on the day before admission the irritation of her corset had caused what she described as "a scaling" on the surface of the skin. On the morning of admission to hospital, when scrubbing a floor, she felt something give way, and on examination she found that the scar in the abdominal wall had burst open and a loop of intestine protruded. She was seen by her doctor and sent in to hospital the same afternoon. Before admission she vomited and more intestine became prolapsed. When admitted she was suffering great pain, her pulse was small, weak, and rapid, and about 4 feet of small intestine were protruding. After an anæsthetic had been given the opening in the old scar was extended upwards, and the coils of intestine were thoroughly washed with warm saline and then returned to the abdominal cavity: one of the coils was much congested but quite visible. The superficial structures were then drawn together, but owing to the enfeebled condition of the patient no attempt was made to perform a radical cure. The convalescence was uneventful, and a month later the ventral hernia was dealt with. The interest in this case centres in the fact that the herniated scar gave way, allowing of prolapse of the intestines, before the patient became aware that there was anything seriously wrong.

Such a complication is known to happen occasionally during the first ten days after an abdominal operation, but cases in which rupture of the abdominal wall and prolapse of intestines have occurred so long after the original laparotomy, without any previous history of ulceration of the skin, are very rare.

Doebbelin (*Deutsch. med. Wochenschr.*, 30th November 1899, p. 793) describes a somewhat similar case, but suppuration had occurred, and pus had been evacuated from an inflamed inguinal hernia some years previously, although there was no external inflammation or ulceration at the time of the rupture. Williams (*Brit. Med. Journ.*, 23rd March

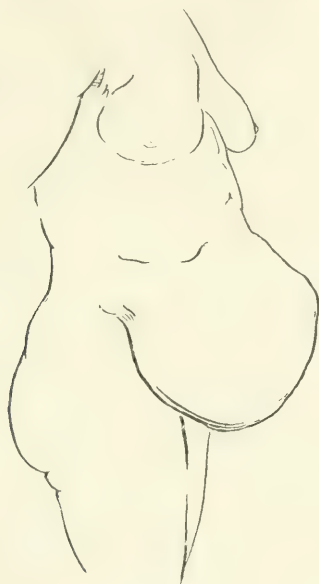


FIG. 2.

Outline drawing from photograph of Case III. before operation.

1907) describes a case of umbilical hernia (no previous operation) which suddenly gave way, but for two months the skin had been discoloured, and two days before admission ulceration had started and had reached the size of a two-shilling piece. Levy and Roques had a case under their care, a man aged 72, who in 1898 first noticed a small hernia, which became strangulated, and was operated on by an interne in 1903. Suppuration occurred, a truss was worn, but the hernia reappeared in 1905 and the truss failed to control it. The skin became discoloured, and finally ulcerated. Suddenly one day, when sitting in a café, the patient felt something give, and after walking home with great difficulty, fainted. Several coils of intestine were found to have protruded, although the truss was

still *in situ*. In a paper (*Bull. et mém. de la soc. de chirurgiens de Paris*, vol. xxv. No. 9) illustrating the toleration of the peritoneum to prolonged exposure, Reynier and Thierry mention a case of a woman who came under the care of the former in 1889 "carrying in her raised apron" coils of small intestine, which had extruded as the result of a rupture of an old laparotomy scar. Dr. A. G. Stewart (*Brit. Med. Journ.*, 1912, p. 1179) describes the case of a patient aged 74 who suffered from a ventral hernia, and had previously worn a truss but had never been operated on, in which spontaneous rupture occurred during a severe fit of coughing. All the above cases recovered.

UMBILICAL HERNIA.

The third patient was a woman suffering from a huge umbilical hernia (Fig. 2), and illustrates the results which can be obtained, even in very advanced cases, by Mayo's operation. She was first seen by me in July 1907, when she weighed 17 st. 5 lbs. There was a huge pendulous hernia, which extended down to the junction of the upper and middle thirds of the thigh, with a corresponding protrusion anteriorly and laterally. Photographs of the conditions were taken at the time. She had been operated on for this condition in England on two previous occasions, with no permanently good results. Owing to her great corpulency I started the treatment by putting her on a modification of the diet recommended by Ochsner, and by the following April she had lost 3 stones. She was then admitted to hospital and operated on by Mayo's method. An elliptical incision over 18 inches long was necessary, and after removal of considerable portions of omentum it was possible to reduce the contents of the sac into the abdominal cavity. Her convalescence was uneventful, and she was back home within a month of her date of admission. Since then she has remained perfectly well, and states she has never enjoyed better health than she has had during the last few years.

I have thought it unnecessary to describe the operation in detail, but I should like to emphasise the importance of careful preliminary treatment of all cases of very corpulent women suffering from umbilical hernia.

MEETINGS OF SOCIETIES.

Edinburgh Medico-Chirurgical Society.

A MEETING was held on 3rd July, Dr. James Ritchie in the chair.

Dr. W. T. Ritchie, for Dr. Gulland, showed—(1) A man, aged 26, suffering from *lymphadenoma*. There was enormous glandular enlargement and signs of mediastinal pressure. An excised gland showed typical lymphadenoma structure. The leucocytes numbered 32,200 per c.mm. ; the increase was due to the polymorphs. There was no increase of eosinophiles. Some improvement had followed an injection of salvarsan, but the patient relapsed again in a fortnight. A second dose was not so efficacious, although there was again a slight diminution in the glandular enlargement. (2) A case of *Stokes-Adams syndrome*, with apparently permanent heart-block.

Dr. Chalmers Watson read a paper on the "*Food Requirements of Children*." An inquiry had been instituted in connection with the feeding scheme of the Edinburgh School Board. An analysis had been made of the dietary of eight children about five years of age, all the children of medical men. It was found that the protein intake in the case of these children was greater than that indicated by Atwater's tables. While the Atwater standard for a child of five was protein 48, fat 40, carbohydrate 168 grms.=1220 calories, the average intake in the eight children examined was—protein 71, fat 67, carbohydrate 198 grms.=1725 calories. The latter standard was regarded as the more reliable guide. The following scheme of one-course dinners for the five school days per week was drawn up :—

EDINBURGH SCHOOL BOARD ONE-COURSE DINNERS (OVER 2000 CHILDREN).

	Protein.	Fat.	Carbohydrate.	Cost.
Lentil soup	29·5	3·7	112·6	£6 3 0
Meat, soup, and potatoes	18·5	9·4	67·2	11 15 4
Plum pudding	36·4	20·2	151·4	12 12 7
Scotch broth	28·2	8·1	71·0	8 4 3
Porridge and biscuit	24·5	4·1	105·3	5 13 5
Grm.	27·1	9·3	102·0	1·2d.

Dr. Goodall said that he agreed with Dr. Watson that the standard indicated by Atwater's table was probably too low. It was important to bear in mind that a healthy child of five was not doing merely moderate but hard muscular work. He also thought that young children might be allowed a considerable amount of red meat with advantage, and thought that the popular idea that meat should not be given to young children did a great deal of harm. Dr. Dingwall Fordyce also thought that meat was an important part of the dietary of children after the first dentition. Dr. Porter said that heredity and individual peculiarity must be taken into consideration. Putrefactive changes were greater after meat food than after farinaceous food. Dr. Pirie stated that he knew the case of two vegetarian families who had never had meat. All the children were in robust health. He thought the School Board dietaries were wanting in anything which might conserve the teeth. Dr. James Ritchie

thought a great deal of the bad feeding among the lower classes was their ignorance of cooking and of economical purchasing. He had seen cases of tapeworm infection from the administration of raw meat. The active habits of children certainly demanded a liberal food supply, but he thought the source of the food-stuffs should be milk products and vegetable food rather than meat.

Dr. W. T. Ritchie read a paper on "*Vagus Stimulation and Paresis in the Treatment of Cardiac Irregularities.*" The inhibitory effects of the vagus having been described, it was pointed out that digitalis and strophanthus act directly on the heart muscle, and also stimulate the vagus. These drugs slow the heart, strengthen the ventricular beats, depress the conductivity of the *a-v* bundle, and in small doses depress the excitability of the heart muscle in a manner comparable to vagus stimulation. All therapeutic measures that stimulate the vagus should be useful when the heart's rate is excessive. In some cases of rhythmic tachycardia due to a valvular lesion and cardiac failure those measures may prove ineffective, and the same holds true of cases of paroxysmal tachycardia. The disappearance of extra-systoles in cases of cardiac failure under treatment with digitalis is usually coincident with the disappearance of dyspnoea, cyanosis, and oedema, and may be due to other factors than depression of excitability by vagus stimulation. In auricular fibrillation all forms of vagus stimulation may act beneficially in virtue of their action on the *a-v* bundle. Atropin is useful in cases of partial heart-block; in *pulsus alternans* digitalis may be of service in slowing and strengthening the heart, in abolishing the alternation, and in giving relief to the patient.

RECENT LITERATURE.

CRITICAL SUMMARIES AND ABSTRACTS.

MEDICINE.

By EDWIN MATTHEW, M.D., F.R.C.P.,
Assistant-Physician, Royal Infirmary.

CÆCUM MOBILE.

THIS condition is now recognised as a distinct entity associated with more or less definite clinical symptoms and signs. Sailer (*Amer. Journ. Med. Sci.*, February 1912) discusses its history, symptomatology, and treatment. Attention was first drawn to the possibility of this disease by Wilms in 1908. In his own work he had found that many so-called cases of chronic appendicitis were not relieved by the removal of the appendix, and that some other disturbing factor must be sought for. Other writers previously had made the same observations in cases of chronic appendicitis, which suggested that the cæcum was at fault, and Wilms published cases that had benefited by dealing with the cæcum.

In cæcum mobile there is a mesentery which allows of free movement of the cæcum like a coil of small intestine. This in itself is not necessarily a morbid condition, but in time renders the cæcum liable to distension and atony.

There is still some difference of opinion as to the symptomatology of cæcum mobile. Fischler thinks there is a more or less definite picture in most cases. First of all there is constipation for a longer or shorter period. This is followed by attacks of colic at irregular intervals, tending to increase in frequency, severity, and duration. During the attack there is loss of appetite with some nausea. In the right hypochondrium and right iliac region a mass can be felt on palpation: it is firm but not hard, elastic but not doughy. Tenderness, which is not very acute, is most marked over McBurney's point, and often one can get gurgling over the cæcum, and sometimes splashing. The pain in the right side is increased by standing or sitting, and much relieved by lying on the back or right side. The attacks of colic are often brought on by over-exertion and indiscretions of diet. Sailer thinks that such a very definite picture is not always present, and believes that obstinate constipation not yielding to treatment by laxatives is the most characteristic phenomenon. The physical signs he regards as more important—signs obtained by palpation, by inflation of the colon, and by X-rays. By palpation one can make out in the region of the cæcum a pear-shaped mass that can be displaced. It is tender on pressure, but not associated with rigidity. There is usually also gurgling. Inflation gives two signs—a disproportionate distension of the cæcum, and insufficiency of the ileo-cæcal valve. By X-rays we can learn that a bismuth meal has been retained in the cæcum much longer than usual. In ordinary cases such a meal reaches the rectum in 24 hours, but in cases of mobile cæcum it does not leave the cæcum for two or three days. Many more cases, however, will have to come under observation before a definite symptomatology is fixed. A congeries of symptoms as above detailed has been in the past ascribed to a chronic appendicitis, but, as has been said, the condition is not even improved by removal of the appendix. Cæcum mobile has also to be differentiated from disease of the right ovary or tube in women, from movable kidney, and from adhesions following the removal of an appendix.

The treatment is not yet definitely established. Some observers believe that by regulation of diet, by prolonged rest, by the use of laxatives, and by massage of the abdomen, a cure will result. Purgatives and oil and other enemata should be avoided. But in the long run it will probably be found that some form of surgical treatment is the means of relief and cure. Fixing the cæcum to the lateral abdominal wall is recommended by some surgeons. (See *Journal*, Feb. 1912, p. 158.)

THE RESULTS OF RENAL DECAPSULATION FOR CHRONIC NEPHRITIS.

The number of deaths from chronic nephritis is very large, and in renal decapsulation we have the most recent attempts at cure or improvement of this condition. A sufficient number of cases has now been recorded to afford reliable information as to the benefits of such operative procedure. Lloyd (*Med. Record*, June 1912) records his own experiences and results, and refers to the other published cases. He himself has operated on nineteen cases, and has been associated with Edebohls in several of the latter's cases. Edebohls has probably had the largest experience in this work, and has operated on 109 cases, with eleven deaths—a mortality of 10.1 per cent. Lloyd's death-rate worked out at exactly the same. But in such a condition as chronic nephritis the death-rate must always be high, and the question is not one of mortality but of curability—*i.e.* a freedom from clinical symptoms after operation. Edebohls's cases show 33 cured, and Lloyd's 8, or 41 cured out of 128 cases—a remarkable result when one considers the usual clinical ending in chronic nephritis.

Decapsulation of the kidneys is recommended for all cases of nephritis which have become chronic—both parenchymatous and interstitial. It is contra-indicated in old age, in cardiac disease, and in cases with albuminuric retinitis. Chronic nephritis may, by medical means, be arrested for a long time, but all cases that steadily become worse should have the chance of operative treatment. The cure is a physiological or clinical one. The sclerotic changes in the kidney are not, of course, affected by operation, but all symptoms disappear, and the condition of the patient's health is markedly improved. After operation the progressive improvement in the patient's general health is very marked, and continues after he is able to be about and at work. As Lloyd expresses it, "The cure of chronic nephritis is only started by renal decapsulation, and the element of time is essential to obtain the full advantage of the operation. In some patients the health of the kidneys is restored in a few months after operation, while in others the same result is reached only after a period of 3 years." And a cure is claimed only when the results fulfil Edebohls's rule—"The urine must remain free from albumin and casts, and the daily urea output be normal (or approximately so) for a period of at least six months following the verification of the disappearance of the albumin and casts, and the patient must be free from all the symptoms of chronic Bright's disease from which he or she has suffered." It follows that after operative treatment such cases should continue to have careful medical treatment until the desired result is obtained. The beneficial results are believed to be due to the formation of a new capsule. In chronic nephritis the tissues of the kidney are bound down by the contracted capsule; the new capsule allows the kidney tissues to expand, and furnishes the organ with a new blood-supply.

SURGERY.

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CANCER OF THE BREAST.

JUDD (*New York Med. Journ.*, 27th April 1912) brings forward some instructive data in a review of the present status of the surgery of mammary carcinoma based on the extensive material of the Mayo clinic. He maintains that from the clinical standpoint it is a mistake to classify breast tumours as simple and malignant, for though from physical examination we can usually diagnose a cancer of the breast, on the other hand we can never say positively that a tumour is not a cancer. Apart from microscopic examination we have at present no means of differentiating between a benign tumour and a very early malignant one. Recent statistics appear to show that from 30 to 35 per cent. of all malignant neoplasms of the breast develop from tumours that were primarily benign, hence the advisability of a prompt removal of all apparently simple growths in the mamma.

Next to carcinoma chronic cystic mastitis is the most frequent morbid condition met with in the mamma. It is present also in over 70 per cent. of cases of malignant disease. The observations of Speese show that malignant degeneration takes place in from 15 to 26 per cent. of cases of this form of mastitis. Consequently such cases of mastitis must be carefully watched, and should any change in size or character, more especially a change confined to one area of the breast, occur, an exploratory incision should immediately be made.

The age of the patient can no longer be considered an important factor in determining whether or not a tumour is malignant. In 518 cases of mammary cancer 46 of the patients were between twenty and thirty-five years of age.

In at least 90 per cent. of cases there is recognisable involvement of the lymphatic glands in the axilla before metastasis to distant parts occurs. A study of the favourite sites for metastases—the liver and certain bones, the femur, the vertebrae, and the humerus—lends further support to Handley's view that the disease spreads along lymphatic vessels. Nevertheless Judd has observed several cases in which there was no evident lymphatic involvement and yet an advanced metastatic growth was present in one or more of the bones. A secondary deposit in a bone may not produce any symptoms, and thus in deciding whether a case of cancer of the breast is too far advanced for operation it is often advisable to have radiograms made of the bones most frequently invaded. Sciatic pains in a patient with a neoplasm of the breast must always be regarded with suspicion: on more than one occasion in such a case an X-ray examination of the

spine revealed secondary deposit in the vertebrae, although at the time of examination the lymphatic structures in the axilla appeared to be free from disease.

During the past two years 264 cases of carcinoma of the breast have been examined in the Mayo clinic. Of this number only 200 were considered operable, and of these there were several which would not have been subjected to surgical interference had the extent of the disease been realised before commencing the operation. An incomplete operation in an advanced case tends to shorten rather than prolong the life of the patient.

If the supra-clavicular glands are enlarged one should be excised under local anaesthesia, and if it be found involved no operation should be advised.

In regard to operative technique, great stress is laid on the removal of a large extent of superficial and deep fascia. It is seldom found necessary to remove so much skin as to require skin grafting to close the wound. Recurrences in the skin occur more frequently in cases in which a large amount of skin was removed and the fascia saved, than in those where less skin was taken and a very free dissection of the superficial and deep fasciae was carried out. The pectoral muscles should be sacrificed, partly to allow of a free dissection of the axilla and partly because in a certain number of cases the intramuscular lymphatics are infected. Active and passive movements of the arm may with benefit be begun within a few hours of the operation. This practice lessens the tendency to persistent post-operative swelling of the arm. In 708 cases of radical amputation of the breast in St. Mary's Hospital there were but three deaths. One was from pulmonary embolism on the sixteenth day, and two were from late infections, one in the third and one in the fourth week.

Naturally the greatest interest attaches to the ultimate result of operative measures for cancer of the breast. Out of 518 cases operated on, 151 were lost sight of, 21 were alive and well after 10 years, 74 were in good health after 5 years, and 233 reported themselves well after 2 years.

THE EFFECTS OF EXTENSIVE RESECTIONS OF THE SMALL INTESTINE.

Flint (*Johns Hopkins Hosp. Bull.*, May 1912) gives a very complete review of the morphological changes and the metabolic effects which follow resections of large segments of small intestine in man and in animals. He finds that in dogs as much as 50 per cent. of the small intestine may be removed, and the animals, after an initial loss of weight, will gradually return to a condition of practically normal weight and metabolism if kept on a favourable diet under good conditions. Such animals are, however, extremely sensitive to unfavourable conditions of diet. Resections of 75 per cent. or even more

of the total small intestine may be survived, but in such cases there is never a return to the normal in regard to weight and metabolism.

After an extensive resection the animals at first suffer from severe diarrhoea, great thirst, and ravenous appetite: these symptoms, however, gradually disappear as compensation becomes established. During this first stage metabolic observations show that there is a marked increase in the excretion of the nitrogenous, the fatty, and to a less extent of the carbohydrate, elements of the food. After compensation has become established an increase in the amount of fats in the food may lead to an increased elimination of nitrogen and fats up to a point about 25 per cent. above normal. Carbohydrates, on the other hand, are absorbed to a degree considerably above normal once compensation is established. Even when compensation is established the amount of indican in the urine shows that there is a greater degree of intestinal putrefaction than normal. This is almost certainly due to a prolonged retention of content in the large intestine. The compensatory process consists in a hypertrophy as well as a hyperplasia of the remaining portion of the small intestine. The villi and crypts enlarge to almost twice their former size, so that in favourable cases the area of epithelial surface is restored to practically normal dimensions. In the human subject such compensatory hypertrophy has not as yet been noted; the metabolic changes, however, are practically identical with those found after experimental resections in dogs. There are five recorded cases where in the human subject a resection of over 13 feet of small intestine was followed by recovery. On the other hand death from inanition has resulted in several cases where only 8 to 9 feet of intestine was removed. The prognosis after extensive resections in the human subject must therefore be guarded, as apparently successful cases may, for lack of suitable compensation, succumb ultimately to a slow process of inanition. Neither the stomach nor the colon appear to have any power of compensating for the loss of large portions of small intestine.

Metabolic studies all serve to show that the best post-operative diet for such cases is one which is rich and easily assimilated, poor in fats and relatively rich in carbohydrates.

CYSTS OF THE OMENTUM.

Simple cysts of the omentum are of comparatively rare occurrence. They have usually been described as of congenital origin, probably arising from lymphatic spaces. Markoe and McPherson (*Bull. of the Lying-in Hospital, New York*, March 1912) record cases of omental cysts. In one case there had been torsion of a portion of the omentum subsequent to an operation for ventral fixation of the uterus, and at a subsequent operation a swelling the size of a hen's egg with a twisted pedicle was found hanging dependent from the omentum. It was

composed of fibrous tissue, organising blood-clot, and numerous cystic spaces. In the second case two separate cystic swellings were removed from the omentum. The appendix was adherent to the wall of one of the cysts, the structure of which showed all the signs of chronic inflammatory trouble. The second cyst was large and smooth-walled and contained clear serous fluid. The wall was composed of dense fibrous tissue and there was no endothelial lining. In the third case the cyst was situated in the sac of an inguinal hernia, and had a long pedicle connecting it with the rest of the omentum. The cyst wall consisted simply of connective tissue. Dowd (*Annals of Surgery*, November 1911) records a case of omental cyst occurring in a young man who had been seized with sudden abdominal pain and faintness whilst straining at stool, and had been laid up in bed with abdominal pain for ten days. About a year later he discovered a swelling in the lower part of the abdomen, which varied in size but tended to grow larger. At operation this was found to be a cyst the size of a large orange dependent from the omentum by a large twisted pedicle.

A very careful pathological examination of the cyst wall and of its contents was made. The cyst contained clear serous fluid but had no endothelial lining, and Dowd concluded that the sequence of events which had produced the cyst was as follows:—

1. A hæmorrhage into the omentum forming a hæmatoma.
2. Absorption of the hæmoglobin and degeneration of the blood-cells as described by Adami and Bradley.
3. Torsion of the omentum with consequent œdema and transudation of the watery elements of the serum into the cyst cavity.

From these records it would appear that some of the simple cystic swellings found in the omentum may be acquired as the result of some antecedent hæmorrhage or inflammation, and that torsion of the omentum is a potent factor both in their production and their continued enlargement.

DISEASES OF CHILDREN.

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INTERNAL SECRETIONS.

IN a recent paper (*Wien. med. Klin.*, No. 4, 1912), Fleischmann deals with the interrelations of glands with internal secretions. Knowledge on the subject is naturally scanty and inexact. We do not know the exact nature of the function of some of the individual glands, and the

part played by each in the complex of associated glands is consequently largely hypothetical.

Léopold-Lévi and Henri de Rothschild in 1911 published a somewhat massive tome on the subject of the ductless glands in clinical medicine (*Nouvelles Etudes sur la physio-pathologie du corps thyroïde et des autres glandes endocrines*). In it they dealt more particularly with the thyroid gland, and according to them many of the symptoms of disease are due to thyroid involvement, and can be remedied by appropriate thyroid medication.

Thyroid is to-day largely used as a therapeutic agent in many and various morbid conditions in childhood, and among conditions in which it sometimes proves of undoubted value is that of delayed recovery or delayed convalescence from acute infective diseases.

But it has been shown for some years that thyroid activity is very closely related to the degree of activity of the pancreas and suprarenal glands, and an interesting contribution to the subject of organo-therapy in the acute infective diseases of childhood is that by Tiscier and Froisier from the clinique of Professor Hutinel on "La surrénalite et la pancréatite scarlatineuses" (*Archives de méd. des enfants*, May 1912).

It has seemed to these observers that the thyroids, parathyroids, and hypophysis are only exceptionally involved, but that lesions of the suprarenals and pancreas are frequent and of the greatest importance.

A considerable number of observations are already on record in which the suprarenal glands have been found post-mortem extensively involved in cases of scarlet fever, but so far only one observer (Pacchioni, *Rivista Crit. di clin. med.*, 1900, p. 861) has noted lesions in the pancreas. A great variety of symptoms of scarlatinal suprarenal involvement—of diminished suprarenal activity—are to be noted. Extreme tachycardia, tendency to collapse, marked asthenia, in cases of malignant scarlet fever, in which post-mortem the suprarenals are found to be involved and the heart and nervous system have apparently escaped. In less severe cases of scarlet fever these symptoms are less marked, and are sometimes accompanied by epigastric pains and even cutaneous pigmentation. Such cases respond well to suitable treatment.

It also seems reasonable to attribute the tachycardia which usually occurs at the commencement of an ordinary case of scarlet fever to suprarenal disorder. The authors state that they have systematically examined the suprarenal glands in children dying from scarlet fever and have found lesions in them to be very frequent. Only occasionally are these lesions visible to the naked eye, and histologically they are found to be most marked in the cortex of the organ. As a rule the medulla escapes, except in those cases in which there are massive hemorrhages. Examination of the organ was in all cases made after preparation of it by three methods—(1) paraffin fixation and staining after Dominici, (2) freezing and staining with Sudan 3, and (3) fixation

with osmic acid. In the cells of the cortex, fat droplets were found to be very scarce or almost non-existent. The cells themselves were altered in a variety of ways. Often they appeared small and shrivelled, with distorted nuclei or with no apparent nucleus at all. In some cases the cells were largely disintegrated. The changes were usually most marked in the zona fasciculata. The pigment was not affected. In the zona glomerulosa the appearances were usually approximately normal, and in some instances there was evidence of hyperplastic change. The gland was always markedly congested, and hæmorrhages of varying sizes were almost constantly present.

As regards scarlatinal pancreatitis, the authors are extremely guarded and rather vague in their definition of the clinical signs and symptoms on which a diagnosis can be based. Macroscopically they say it is rare to find changes in the pancreas, but histologically changes of a variety of sorts are met with. Generally speaking there is congestion, hyperplasia of the interstitial tissue, and infiltration of leucocytes. The changes are chiefly interstitial and degenerative. The acini of the gland are more often and more profoundly altered than the islands of Langerhans.

As regards treatment, the authors strongly recommend the administration of suprarenal, which has already in their hands proved of great value in these cases.

The preparations they have used have been adrenalin solution (1 in 1000) and extracts of the entire gland. The adrenalin solution is given in doses of 2 drops for each year of the child's age, but these doses can be doubled or even trebled in pressing cases. The glandular extract is given in the dose of 0.3 gr. to 0.5 gr., according to the age of the child.

The authors report 6 fatal cases with the post-mortem findings, and 4 cases of recovery showing the beneficial effect of suprarenal treatment.

INFANT FEEDING.

In the *Archives of Pediatrics* for May 1912 Dr. Maynard Ladd has a paper on "Studies in the Nutrition and Digestion of Infants," and in an editorial in the same journal one reads—"It is very satisfactory to see, in the articles which appear from time to time on the subject of feeding, less dogmatism, less partisan spirit, and a greater appreciation that those who have written before have been right in part, if not wholly, and that the consideration of the individual child must be the real basis of all successful feeding. We do not find so frequently on the one hand the advocate of extremely high fats, on the other the man to whom all fat is poison. Less often is the caloric method reviled and the percentage method extolled, or *vice versa*. Not so often are the systems of America contrasted with those of Germany to the

advantage of the one and the detriment of the other. Even the quarrel with heated milk is not so furious. Men realise better that no one method is always successful, that the principles underlying successful artificial infant feeding are true whether they be expressed according to one method or another, in this language or in that. . . .

"What is necessary is to teach how intolerance of any food may be recognised and the factor at fault determined. The problem of vomiting, for instance, needs for its proper handling a comprehension of the curdling of milk, of the arrangement of the curd in the stomach, of the capacity of the stomach, of the chemical control of pylorus and cardia, of the retarding effects of high fats, of the proper intervals to ensure an empty viscus. The physiologist and the writer of articles on experimental medicine do more to further the problem than the writer of the ordinary article on feeding, especially that which is replete with formulas or lays down exact and unalterable rules."

Dr. Ladd writes:—"In this country the development of the art of infant feeding has been along the lines of percentage modification of cow's milk. Originally the idea underlying this system was the effort to so modify the composition of cow's milk that its percentage of fats, sugar, and proteins should resemble the composition of breast milk. The amount of each feeding, the intervals between feedings, and the total number of feedings were adapted to the individual requirements of the child on the basis of the experience gained in breast-fed babies. It was soon evident, however, that artificial or substitute feeding was a much more complicated problem. Cow's milk modified to the composition of breast milk often failed to nourish infants properly, especially when their digestion and nutrition had been lowered by weeks and months of unsuccessful feeding. This led to much experimentation with modified milk formulæ varying greatly in composition from that of breast milk.

"The pediatricists of Europe attacked the problem from quite a different point of view from that of the American workers. Their investigations ignored, for a time, the influence of the different elements of milk in digestion and nutrition. They determined the caloric value of breast milk and reduced the factors to the required calories per kilogramme of baby-weight—the so-called 'energy quotient.' The quantity of food was reduced to an amount proportionate to the body-weight. The calories were supplied by the use of whole milk, with the addition of sugar or carbohydrate in some form. No effort was made to make any fine distinction between the different elements of the food. As long as the food had the proper energy value and was sufficiently diluted it was made to serve its purpose.

"Within recent years, however, we have been aware of changes in the German methods as well as in our own. We, in America, have been giving more attention than formerly to the caloric value of our

percentage combinations. On the other hand the Germans have been studying the effects of variations in the elements of the milk from which the calories are obtained.

"There should be no conflict between percentage feeding and feeding based upon calories. Both methods attempt to express the value of a food in intelligible terms—the first expresses the composition of the food in percentage of its elements; the second gives the fuel value of the mixture as a whole. It is self-evident that no infant can be fed exclusively upon either fats, carbohydrates, or proteins; it must have all three elements. Percentage feeding simply expresses in a form easy to understand the ratio between the fats, carbohydrates, and proteins; that is, the balance of the mixture.

"The 'energy quotient' is simply a means of stating the fuel value of the food as a whole, in terms of calories, to each kilogramme of body-weight."

The developments of teaching in infant feeding are highly interesting. Dr. Ladd implies that the teaching of Germany is the teaching of Europe, and undoubtedly he is right, speaking generally, in considering the American and the German schools as the two sources *par excellence* of fervid and dogmatic teaching on the subject. The American school has advanced to the stage of recognising and admitting the limitations of its previously extreme and one-sided teaching: the German school, while utilising in moderation the theories of the American school, has built up a foundation of its own for infant feeding, which, theoretically, is a distinct advance, but which has been, and is being, carried on in practice to lengths which cannot stand the criticism of time.

Dr. Ladd is undoubtedly right when he says "that the artificially-fed baby to-day has a much better chance for life than it had twenty years ago," but as one of his conclusions he states—"The detailed study of the weight and feeding charts in a large series of cases shows great variation in the individual requirements and the impracticability of applying general rules of feeding to the atypical and difficult cases."

"The artificially-fed baby to-day" has for its benefit recent advances in many branches of general medicine. Infant feeding is a special study, but correct infant feeding must be subject to the laws and variations which rule the fundamental sciences governing the science and art of medicine in general.

DERMATOLOGY.

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CRYPTOGAMIC PARASITE OF ERYTHEMATO-SQUAMOUS ERUPTIONS
OF THE TYPE OF PITYRIASIS ROSEA.

WITHIN certain limits generalised erythematous-squamous eruptions include dissimilar affections whose etiology is still unknown. Since the skin of different individuals does not always react towards the same agent in an identical manner, it may be that ailments due to the same infection have been, from studying the clinical features alone, divided unnecessarily. Thus we have pityriasis rosea of the Gibert type, where a primary lesion appears, usually on the trunk, and is succeeded rapidly by others passing through the same phases, and having a self-limited duration, varying in particular cases from a few to many weeks. The eruption begins as a delicate rose-coloured macule, which extends peripherally, while it changes to a fawn tint in the centre, is but little scaly and hardly itchy. In a second form the evolution is more gradual, while the elements are larger and more yellowish in hue. In a third variety the evolution is accelerated, the constituents are of a deeper red, and though like the others fading in the centre, are followed by a desquamation resembling that of scarlet fever. The first and third forms seem most common in women, the second in men. In the scales from three such cases Du Bois (*Ann. de dermat. et de syph.*, Paris, January 1912) has discovered a cryptogam apparently identical in all. To obtain it early lesions must be selected, as he has failed to find it in scales which have been shed. By careful manipulation with a fine bistoury the horny covering of an entire macule can be removed. This is laid on a slide and a cover-glass placed over it. Petroleum ether is then introduced between to dissolve out the fat, and then the specimen is mounted in balsam of Peru. The parasite is represented by masses of round spores, the largest of which do not exceed 5 μ .; the smallest are difficult to measure. They are visible under a No. 3 objective, but are quite distinct under a No. 6. They are embedded in the follicular sheaths which have been torn out in process of separating the scale. The highest powers do not bring out any trace of mycelium. Cultures on all the media usually employed have proved sterile, and inoculation on the patient or on others by friction or scarification did not take. Vidal, in 1882, in one case of circinate pityriasis, found a fungus which

he called microsporon anomæon or dispar. This has so far not been confirmed by subsequent observers, but his illustrative plate somewhat resembles the parasite described and figured by Du Bois, though the elements were apparently smaller. If confirmed, this parasite is possibly the etiological agent. It should be added that liquor potassæ does not suit the display of this parasite, which is very delicate and readily breaks up. Staining, too, gave irregular results.

AN ERUPTION EVOKED BY EUCALYPTUS BONBONS.

It is well known that the inunction of eucalyptus oil as a remedy for neuralgic and rheumatic affections may occasion an acute dermatitis, and, further, it has been noticed that contact with the eucalyptus plant grown in houses may, in sensitive individuals, give rise to itchy rashes, assuming an erythematous, papular, or urticarial type. Vörner has published an example where a recurrent urticaria, in which on the fading of the wheals pigmentation was left behind, was started by taking eucalyptus oil on sugar. Oppenheim (*Dermatol. Wochenschr.*, Hamburg, 24th February 1912) has published a case where a man aged 36, two days after swallowing a considerable number of lozenges, designated "cough not," and containing eucalyptus oil, suffered from an erythema papulatum toxicum. The lesions consisted of red and brownish firm macules and papules, seated on the extremities, and especially on the palms and soles. Some were hæmorrhagic. Twelve days later these had not wholly disappeared. The outbreak was preceded by fever and some systemic disturbance. The occurrence emphasises the necessity of careful inquiry into the nature of all ingesta when any mysterious autotoxic eruption is met with.

TOILET AND COSMETIC POWDERS.

The custom of powdering the face is one of old standing, and at the present day seems increasingly popular. It is asserted that by the employment of powder the face is protected from heat and cold, moisture is thereby absorbed, greasiness abolished, while under it abrasions heal. But a still more important point in the estimation of many who use it is that thus defects in transparency of complexion are mitigated, while blackheads, scars, and small pustules are concealed. The cosmetic properties of powder constitute its chief recommendation. Kapp of Berlin has set himself to investigate the composition and action of those principally made use of (*Dermatol. Wochenschr.*, Hamburg, 20th April 1912). The bases of the powders may be vegetable or mineral or both. The first are either starches, as those of wheat, rice, potato or arrowroot, or almond or bean flour, or powdered iris root.

Wheat starch swells at first when moistened with water or rubbed up with animal fats, then finally breaks up into granules: rice starch in similar circumstances swells much less, and potato starch hardly at all. Arrowroot absorbs more water and oil than those previously mentioned, bean meal still more water but little oil, while powdered iris root scarcely changes. The mineral substances are more numerous. Oxide of zinc shows round grains under the microscope. These are insoluble in water though soluble in dilute acids, and apt to form clumps. Armenian bole produces a tough doughy mass with water. Tale has a crystalline appearance, while magnesium carbonate is in rounded grains: both are insoluble in water. Borax and precipitated carbonate of lime are crystalline. Terra silicea-dioxide of silicium occurs in long pointed needles. Examination and cultivations of the contents of numerous powder boxes and of the dust from the puffs or brushes were made. Many micro-organisms were discovered, but most of these were of a non-pathogenic nature. In one case, however, *Unna's* micrococci, in another streptococci, and in a third tubercle bacilli were isolated. The conclusions reached were 1. Vegetable powders injure the epidermis and skin mechanically through the swelling of the powder granules in the substance of the skin, in the skin fat and skin moisture. Thus when they enter a skin pore they tend to widen it, and when frequently applied produce ugly gaping apertures. The least harmful is iris root powder, since it alters so little. All tend to decompose, especially arrowroot and almond and bean flour. Mineral powders do not swell or decompose, but from their angular structure they are apt in some instances to slightly abrade the surface. Oxide of zinc, Venetian tale, and precipitated carbonate of magnesia are least hurtful—mechanically or chemically. Infection of various skin disorders is a possible consequence of systematic use of powders. Instead of puffs or brushes, pledgets of cotton-wool ought alone to be made use of and subsequently destroyed. Still better is it to have the powder blown on to the face by means of a compressible indiarubber ball. Daily massage of the skin, and, after drying, the application of a good cold cream, diminish the evils of regular powdering.

THE CAUSE OF TELANGIECTASES AND ABNORMAL CUTANEOUS REACTION.

Among the alterations in the skin which may arise subsequent to treatment by the Röntgen rays the appearance of telangiectases possesses a special interest, for they can crop up in skin apparently sound even years after exposures which have been carried to the length of occasioning dermatitis. Hitherto no satisfactory explanation has been forthcoming, but Luithlen of Vienna (*Dermatol. Wochenschr.*, Hamburg,

27th April 1912) attempts to account for them. A patient of nervous constitution, suffering from psoriasis, was attacked with urticaria, in association with which a severe seizure of asthma came on. On a portion of skin, which four years previously had been the seat of an erythematous dermatitis, resulting from a therapeutic exposure to the X-rays, but which had since then been free from psoriasis and wholly normal, there developed severe swelling and reddening of the skin, with patches of psoriasis. When the psoriasis had faded as the result of local treatment a network of dilated vessels became visible on the now white skin, and these spread over the entire area where the dermatitis had manifested itself. Luithlen remarks that this case indicates that the eruption of psoriasis is not solely evoked by external irritants, but also by changes taking place within, through direct action on the blood-vessels. Freund has noticed that on the occurrence of pregnancy telangiectases have appeared in apparently normal skin which years before had been exposed to the X-rays. In the case cited there were toxic substances present which poisoned the system and induced the urticaria. One can certainly assume an effect of these circulating toxins on the vessels. On all parts, except those which had previously been rayed, the influence was transitory. We know that the X-rays can damage the vessels, and that this may proceed to extensive anatomical alterations. Even slight exposures to the rays alter the reaction of the skin towards external irritants, producing increased sensibility to therapeutic interference. Thus regions affected with psoriasis, which have had only a few and these brief exposures, react with abnormal intensity when chrysarobin or pyrogallol are applied, though neighbouring parts which have not been rayed stand the same drugs without detriment. He ascribes the telangiectases in his recorded case to a permanent alteration in the vessels having been brought about by the rays, even though the skin presented a normal aspect. The toxin which originated the urticaria, and which in the case of normal vessels only caused a passing congestion, transudation, and exudation, produced in the already damaged and therefore less resistant vessels which had experienced the Röntgen dermatitis a lasting dilatation. In pregnancy, in like manner, there are toxins thrown into the general circulation, generated by changes in metabolism, and such can act on the vessels whose vitality has been lowered in the same way as the toxins in urticaria. Other observers as Krause have established the fact that various circumstances in the sexual life of women, such as menstruation and lactation, as well as pregnancy, produce increased sensibility or anaphylaxis in the skin towards exposures to X-rays. An irritation of the vessels as a sequence of the presence in the circulation of special products of metabolism may explain many phenomena whose connection with the sexual sphere clinical observations have hitherto only vaguely hinted at.

THE CULTIVATION OF THE BACILLUS OF LEPROSY, AND THE TREATMENT OF CASES BY MEANS OF A VACCINE PREPARED FROM THE CULTIVATIONS.

Both Rost and Williams (*Leprosy*, vol. xii. fasc. 3, London, 1912) have succeeded in a few cases in isolating and cultivating a bacillus. Rost employed a medium of distillate of volatile alkaloid of rotten fish, Lemco, and milk, while Williams used Lemco, distilled water, and milk, and the organism obtained was practically the same in both instances. Williams got also a streptothrix, and is disposed to regard the bacillus as a phase in the life-history of a streptothrix. A monkey repeatedly injected by Rost with culture developed clinical signs of leprosy, and nodules appeared in which were found typical lepra bacilli. He failed, however, to produce a pure cultivation from these. A vaccine was prepared, and in ten cases in which treatment by this vaccine has been adopted two have recovered, two have so much improved that apparently the remnants of the disease are very slight, while the remaining six have benefited remarkably. Williams has experimented with a vaccine made from a two-months' old streptothrix membrane grown on milk. This has produced, in appropriate doses, marked general reaction and also local reaction in the leprous lesions present in lepers. These reactions have been followed by improvement in the leprous condition. Two anæsthetic cases treated by the vaccine have shown a rapid return of sensation in the affected areas. In non-lepers there was a certain degree of reaction for twenty-four hours at the site of injection, and slight fever. The reaction produced by the vaccine in lepers seems to be proportionate to the severity of the disease.

TROPICAL DISEASES.

By MAJOR D. G. MARSHALL, M.B., I.M.S.,
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"TROPICAL DISEASES BULLETIN."

INDICATION of a distinct advance in the systematic study and investigation of tropical diseases is furnished by the announcement that the bulletins hitherto published by the Sleeping Sickness Bureau will in future include information regarding not only sleeping sickness and kala-azar, but also tropical diseases in general, under the title of the *Tropical Diseases Bulletin*. The Bureau, which will be under the charge of a director, assistant-director, and skilled assistants, will be housed in the Imperial Institute, where files of publications on tropical diseases will be open for inspection to all who desire to see them. Copies of the *Bulletin* will be supplied free of charge to medical officers in India and

to those serving in the subscribing colonies, viz. the Sudan, Union of South Africa, Ceylon, Malay States, Southern Nigeria, Sierra Leone, Gambia, Fiji, Trinidad, and Jamaica: others may obtain copies through booksellers, the annual subscription being fixed at a guinea. A separate *Veterinary Bulletin* dealing with the diseases of animals in tropical countries will be issued.

The bulletins on sleeping sickness and kala-azar have been widely appreciated. The new *Bulletin*, which will no doubt be edited with the same skill and care, is sure to prove a success, and with a wider range of subjects will appeal to a much greater number of appreciative readers. All interested in tropical diseases should arrange to be regularly supplied with the *Bulletin*.

HEALTH OF THE ARMY IN INDIA.

The Annual Report of the Sanitary Commissioner with the Government of India for the Year 1910 shows a continued improvement in the health of British troops in India, especially in the incidence of such preventable diseases as cholera, malaria, enteric fever, and dysentery. The rates for admissions and deaths are the lowest on record.

These results are attributable, not to any alteration in the climate of India, but chiefly to the altered attitude adopted by the Government of India some 20 years ago towards the medical services, resulting in the introduction of a good water-supply in most stations occupied by British troops, and the provision of more adequate means for the scientific diagnosis, treatment, and prevention of disease.

The subjoined figures relating to the statistics for the last 13 years may be found of interest.

	Admissions per 1000.	Deaths per 1000.
1897-1901 . . .	1285.3	13.05
1904-1908 . . .	846.6	9.86
1910 . . .	576.5	4.66

To anticipate the possible argument that the diminished death-rate was due to an increase of invaliding in hopeless cases, it may be stated that while the average invaliding from 1897 to 1908 was over 30 per 1000, in 1910 it was only 7.77 per 1000. In the past the high admission rate was chiefly due to venereal diseases—the year 1895 showed a maximum of admissions for this class of disease of 522.3 per 1000, in 1903 the rate was 247 per 1000, in 1910 only 58.9 per 1000. This gratifying result is justly attributed in the report to “the earnest co-operative effort not only between combatant and medical officers, chaplains, the authorities of the Royal Army Temperance Association and other civilian officials, but between all these and the men themselves.”

The deaths from enteric fever for the period 1891 to 1900 averaged

6.46 per 1000, while in 1910 they were only 0.63 per 1000. Of the 335 cases and 46 deaths recorded during the year, 148 cases with 24 deaths occurred in soldiers who had not been inoculated, 187 cases with 19 deaths in soldiers who had been inoculated. The number of inoculated men is greater than those not inoculated: it would therefore appear that the incidence of the disease is greater among the inoculated, but the death-rate is lower, and complications, especially haemorrhage and perforation, are of less frequent occurrence.

Space does not permit further consideration of this report. It bears on every page direct or indirect appreciation of the splendid work performed in India by the medical services for the prevention of disease.

AFFECTIONS SIMULATING MALARIA.

It is a fact well known to all engaged in the treatment of tropical affections that when a person has suffered from malaria, in any subsequent affection accompanied by rise of temperature the fever is apt to present the features of a typical malarial attack, with a hot and cold stage and often marked periodicity. A case of this nature was published in this *Journal* in May 1911; the symptoms were found to be due to syphilis. Low and Newham (*Journ. Lond. School of Trop. Med.*, March 1912) describe in detail a case characterised by remitting pyrexia and anemia. By careful investigation all forms of tropical diseases were excluded, also tubercle and syphilis; later, the patient developed symptoms resembling those of Addison's disease, and malignant disease involving the suprarenals was considered as a probable cause of the symptoms. At the post-mortem the liver, spleen, and pancreas presented nodular growths, which on examination were found to be round-celled sarcomata. The suprarenals were normal.

Vanderhoof (*Journ. Amer. Med. Assoc.*, 12th April 1912) records 47 cases of pyelitis treated during the last 5 years, 21 of which had been diagnosed and treated as malaria on account of the close resemblance of the symptoms to those found in malaria.

SLEEPING SICKNESS.

Detailed reference to the many interesting articles on this disease in the *Sleeping Sickness Bulletin* cannot be attempted, but a very important and practical question is, When may a case of sleeping sickness be considered cured? A recent writer (*Ann. Trop. Med. and Parasitol.*, vol. v. No. 2) places the limit at experimental animal inoculation, apparently disregarding Broden and Rhodain's work, which showed that a case could not be regarded as absolutely cured until the cerebro-spinal fluid showed not only absence of trypanosomes, but was found to be chemically and cytologically normal.

INFANTILE KALA-AZAR (NICOLLE).

The whole of the *Kala-Azar Bulletin*, 22nd March 1912, is devoted to an interesting and extensive account of our present knowledge of this disease.

Since Nicolle in 1907 published his first description of cases in Tunis, the disease has been found to be widely spread (as shown in an accompanying map) on the shores of the Mediterranean, and it is probable that when the very complete description of the symptoms and methods of diagnosis contained in this article are more widely known, cases hitherto described, not only in the Mediterranean area but elsewhere, as infantile splenic anaemia will be found to be due to *Leishmania* infection. In this connection it is important to note that Patton (*Ind. Med. Gaz.*, March 1912) has found that the development of the kala-azar parasite occurs not only in the Oriental bed bug (*C. rotundatus*) but also in the European bug (*C. lecticularis*). Is it not quite within the range of possibility that the disease may eventually spread to this country?

While the disease usually attacks only young children, the great majority being under three years of age, it has been found in older children and in adults. Presumably the adult cases were proved not to be ordinary kala-azar by inoculation experiments on dogs. The chief features of the disease are carefully noted. These, according to Nicolle, are pallor of the skin, emaciation, oedema, fever, and hypertrophy of the spleen. The complications are hæmorrhages, skin eruptions, and dysentery or diarrhoea. A chart shows that, as in adult kala-azar, a double or treble daily rise of temperature is common in the early stages. For careful observation of cases the temperature should be taken every 3 hours. According to various observers the pulse is usually accelerated, sometimes to 150 or 160 per minute: there is not a marked leucopenia—two features which differ from those usually presented by ordinary kala-azar. As regards prognosis, it is found that though the disease is almost universally fatal, the course is often prolonged for years, and in many cases spontaneous cure results.

In treatment many drugs have been tried, including iodides, mercury, silver in colloidal form, arsenical compounds, and others, but the results have not been satisfactory.

THE ETIOLOGY OF YELLOW FEVER.

The many theories regarding the actual cause of this disease and the mode of transmission are ably summed up by Harold Seidelin (*Yellow Fever Bull.*, November 1911). Further, he presents for consideration a new organism, the *Paraplasma flavigenum*, which, he states, he has found to be present in "about 90 cases out of a total of slightly above one hundred." The article is accompanied by a coloured plate, from which the parasites found in the stains of blood appear to closely

resemble piroplasmata. During the early stage of the fever they are extremely minute and scanty, and can only be properly observed by using a No. 18 eye-piece and a 2 mm. or 1·5 mm. lens, the latter giving with the No. 18 eye-piece a magnification of 3000. Whether the *Paraplasma flavigenum* will be proved by further work to be the real cause of yellow fever, or whether it will obtain the verdict of "not proven" passed on Freire's *Cryptococcus xanthogenus*, Sanarelli's *Bacillus icteroides* and other organisms, remains to be seen: in the meantime the author's conclusions have been severely criticised by Agramonte (*Med. Rec.*, N. Y., 30th March 1912). He lays stress on two points—(1) the smears were stained in an imperfect manner with an unstable reagent (Giemsa), and (2) while the blood of a yellow fever patient has been proved to be infectious only during the first three days of the attack, Seidelin's bodies have not been observed by him except from the fourth to the eighth day.

SALVARSAN IN TROPICAL DISEASES.

This remedy has been given a trial in various tropical diseases with varying results.

Faws.—Since the organisms found in this condition so closely resemble the *Treponema pallidum*, it is not astonishing to find that good results have been obtained. Castellani, Alston, and Strong have found it practically a specific.

In *malaria* the results are not satisfactory. Tuschinsky (*Deutsch. med. Wochenschr.*, 1912, p. 548) has used it in 77 cases. In quartan and æstivo-autumnal fevers the effects were transitory or slight: in benign tertian the results were better, but recurrence was noted in several cases. It does not appear that salvarsan possesses any advantage over quinine in the treatment of malaria, and considering the greater difficulty of administration and the probability of serious after-results, further trial appears inadvisable.

Bilharziosis has so far defied all forms of treatment. Day and Richard have given salvarsan a fair trial (*Lancet*, 27th April 1912), and conclude that it has no good effect either intramuscularly or by intravenous injection. Owing to ill effects which occasionally resulted they do not recommend its use in this disease.

Leprosy.—Poldrock (*St. Petersburg. med. Zeitschr.*, 14th May 1912) publishes voluminous and exact clinical notes on 9 cases of leprosy treated with salvarsan. They are worth perusal in the original by all interested in the treatment of this disease.

In five cases salvarsan alone was used; in the remainder it was combined with the use of a complement containing serum derived from animals. The writer was induced to try this method on learning that Julius Eliasbergs had reported the absence of free complement in the blood of lepers, and that this absence of complement, although ambio-

ceptor and antigen were present, possibly formed an explanation of the incurability of the disease. The doses of salvarsan, administered by intramuscular injection, varied from 0.3 to 0.6 gm., the total dosage varying from 0.4 to 1.7 grms. in 4 injections. During the treatment the general condition of most of the patients improved: there was an increase in body-weight, and the ulcers and skin lesions showed benefit. In some, however, although there was a diminution in the size of the tubercles, fresh nodules appeared.

In the cases treated with salvarsan and complement it is noted that with small doses of complement there was no result. When larger doses were used there was often great constitutional disturbance, rigors, and fever with severe urticaria. In no case was any improvement found after a period of 6 months, and Poldrock concludes that salvarsan alone, or combined with complement, has no lasting effect on the progress of the disease. He quotes similar opinions expressed by Isaac Verteuil, Montesanto, and others, who have used salvarsan in the treatment of leprosy.

Pellagra.—Crauston (*Journ. Amer. Med. Assoc.*, 18th May 1912) reports the results of treatment of 11 cases: 18 per cent. were cured. These results are stated to be not very encouraging but sufficiently good to justify further trials of salvarsan.

To quote the words of Campbell and Patch, who (*Canad. Med. Assoc. Journ.*, April 1912) have experience of the effects of the injection of salvarsan in 331 cases, including carcinoma and amoebic dysentery, "we must, as far as salvarsan is concerned, feel our way and proceed very cautiously, that false hopes and vain illusions may not be followed by vain and lasting regrets."

EOSINOPHILIA IN HOOK WORM INFECTIONS.

It is generally admitted that demonstrations of the presence of ova in the stools is the only certain method of diagnosis in this condition. When it is necessary to examine large numbers of men, as a prophylactic measure, it has been suggested that examination of the blood for eosinophilia might be sufficient.

A case recorded by Coppedge (*Journ. Trop. Med. and Hyg.*, 1st June 1912) shows that even in a very severe infection the blood may show an absence of eosinophiles. When the patient's condition had much improved the blood only showed one eosinophile in several slides.

Figures published by Bass, Dock, Gomez, Chamberlain, and others show that while the degree of eosinophilia may be as high as 36 per cent., it is often, in well-marked cases, as low as $\frac{1}{3}$ or 1 per cent., these low counts auguring a bad prognosis.

It is therefore evident that examination of the blood may be misleading, and examination of the stools is essential for reliable diagnosis.

PATHOLOGY.

By JAMES MILLER, M.D., F.R.C.P.,

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EXPERIMENTALLY-PRODUCED DERMoids.

ADAMI (*Principles of Pathology*) defines a teratoma or dermoid as "an autonomous growth, the product of the continued development within one individual of another individual of the same species." By this definition the normal foetus is excluded, as its development is only of a temporary nature. All gradations can be traced from ordinary twins through attached twins, in which one individual is weaker, and so atrophies, to the inclusion of a twin inside the stronger individual, the last being a teratoma or dermoid. Quite clearly it must be from some totipotent cell that the dermoid takes origin, because the latter contains all types of tissue found in the fully-developed foetus—is in fact an attempt at a new individual. In a majority of cases it is in all probability from the germinal blastomeres or mother cells of the ova and spermatozoa that the teratomata arise. These germinal blastomeres are the direct descendants of the sexual cells of the previous generation. They are set apart at the very earliest period of segmentation of the fertilised ovum. They eventually become lodged in the generative glands and give origin to ova or spermatozoa of the new individual. They may, however, become misplaced and lodge in some unusual part of the body, hence, although dermoids are much more common in the neighbourhood of the sexual glands, they also occur in the neck and other parts.

It is now some considerable time since experiments were first carried out by inoculating animals with embryos in an attempt to produce tumours. Numbers of workers have taken part in this investigation, but the name most usually associated with the more modern work is Askanazy of Geneva, and it is his work which is now under review. A paper of his published in 1909 (*Wien. med. Woch.*, pp. 2518 and 2578) gives a good résumé of the work up to that date. After trying a number of animals the author found the white rat to give the best and most uniform results. One might be inclined to imagine that the younger the embryo the more likely would it be to develop a tumour. That, however, is not the case. Embryos measuring $\frac{1}{2}$ to $\frac{3}{4}$ cm. often give negative results, while older ones of 1 to 4 cm. give almost constantly positive results. The embryo may be that of the animal injected or it may be from another white rat. The male is susceptible to inoculation as well as the female, but the female exhibits a greater predisposition. The embryo is pounded up into a sort of mash, although results are also obtained by implanting the whole embryo. The mash may be injected into the subcutaneous

tissue, peritoneal cavity, or, indeed, into any part of the body. The best positions are undoubtedly the subcutaneous tissue and the peritoneal cavity, with a preference for the latter. Injection into the brain and the parenchymatous organs gives almost uniformly negative results. In many cases the material is simply absorbed: in other cases development occurs for a time and then stops: in others, again, retrograde changes take place after a tumour has developed. In a considerable percentage, however, the resulting tumour continues to grow, in some cases for as long as two years or even more. Borst (*Atti del 1° Congresso Internazionale dei Patologi*, Torino, 1911, p. 24) has obtained 74 per cent. of positive results by intra-peritoneal injection. This author notes a number of further interesting facts, such as that animals in which subcutaneous injection was a failure were not protected from subsequent intra-peritoneal injection.

As regards the appearance of these tumours, the size varies very much. Occasionally one would develop measuring $5 \times 5 \times 3$ cm., but most were somewhat smaller. The tumours are rounded, obviously consisting of a series of cysts in most cases where the injection has been made into the peritoneal cavity. Sometimes these are aggregated together, at other times they are separate. They are yellow or grey in appearance according to the nature of the contents, which may be epithelial debris or mucinous material. In short, the appearance at once suggests that of the ovarian dermoid.

Microscopically all types of tissue are found, the most common being cartilage, bone, skin, teeth, non-striated muscle, but liver, lung, brain, and other organs were occasionally present. An interesting point is that these tissues need not necessarily be already pre-formed in the embryo injected in order to appear in the resulting teratoid. The cysts are lined sometimes with ciliated, sometimes with stratified squamous epithelium, and sometimes with chalice cells. The contents, as already mentioned, may be epithelial debris or mucinous material. From the point of view of microscopic appearances, therefore, these tumours resemble the ordinary ovarian dermoid very closely.

With regard to further variations in conditions which modify the growth, the age of the animal used for experiment was found to be a matter of indifference. Both Askanaazy and Borst noted that the gravid state increased the tendency to the tumour formation in an animal. Cooling the embryo mash seemed to increase the rapidity of the growth of the tumour which developed after its injection. Injury to the growth after it had started seemed to increase the rapidity of growth subsequently.

An attempt was made to see if it were possible to enhance the virulence of a tumour by sub-inoculation from animal to animal, as was done by Ehrlich in the case of certain malignant mouse tumours. This was, however, found not to be the case. Sub-inoculation of

already growing teratoids occasionally succeeded, but the resulting tumours were small.

As previously stated, cooling the embryo mash did not kill it. After preservation on ice for 16 and even for 25 days the mash still retained its capacity to produce tumours.

A number of interesting results were obtained by treating the embryo mash with various chemical agents previous to inoculation. A 4 to 5 per cent. ether water was prepared and the mash mixed with this. The mixture was immediately implanted and a very marked increase in the rate of growth of the subsequent tumours was noticed. This was not merely due to increase in the size of the component cysts, but to more rapid proliferation in the embryonic cells composing the various tissues. The same effect is not produced if ether be injected into the tumour after it has commenced to grow.

Röntgen rays were found, as might have been anticipated, to exercise a restraining influence upon the growth of the tumours. Even 30 seconds' exposure was sufficient to produce a perceptible amount of diminution in the rate and amount of growth.

In view of the above-mentioned results with ether, Askanaazy (*Atti del 1 Congresso Internazionale dei Patologi*, Torino, 1911, p. 27) has investigated the effect of allied chemical substances. In a series of four experiments ethyl alcohol in 8 per cent. solution, when mixed with the embryo mash, caused in two cases tumours of an unusually large size. Other experiments with xylol, benzol, and acetone were entirely negative. In one experiment with lipase (steapsin) a very large subcutaneous teratoid was obtained. Chloroform gave negative results, but with chloral hydrate in one case out of four an exceptionally large tumour was produced. In another a teratoid tumour developed, in connection with which, after an interval of $1\frac{3}{4}$ years, a malignant (squamous epithelioma) tumour arose, which caused the death of the animal.

All these later experiments were suggested by the work of Meyer, which goes to show that lipid dissolving substances act more energetically upon cells than those not capable of dissolving lipoids. Wacker and Schmincke (*Monch. med. Woch.*, 1911, Nos. 30 and 31) have investigated this question more fully with a view to finding some tumour-producing chemical. These observers injected a series of chemical substances into the ears of rabbits and noted the amount of subsequent epithelial proliferation. They found that indol dissolved in rabbit fat produced marked epithelial proliferation, and similarly acetone. On the other hand neither ether nor chloroform produced proliferation. As a result of their investigations they conclude that only those substances which are lipolytic are capable of producing proliferation of epithelium, although not all lipolytic bodies have this effect.

It should be stated that Borst (*loc. cit.*) also carried out some experiments by treating embryo mash with chemicals such as ether and indol, but failed to note any increased energy in the growths which resulted from the injection of the material.

These various results as to the influence of chemicals upon cell proliferation are obviously conflicting. At the same time positive results, such as those of Askanazy, must be susceptible of some explanation.

A point upon which Askanazy lays some stress is that in three instances malignant tumours have arisen in connection with experimental dermoids. This is all the more noteworthy as in the many generations of white rats observed by him no instance of a spontaneous malignant growth was found. One of these tumours was a carcinoma, one a sarcoma, and the other a myxosarcoma. In two of these instances the embryo mash had been previously treated with lipolytic chemical substances. In both cases the fetuses inoculated were relatively young, and in both a period of a year elapsed between the inoculation of the embryo mash and the development of the malignant growth. Askanazy considers that there are two possible explanations of this occurrence—either the more advanced age of the rats made them more liable to malignant disease, or some change took place in the teratoid cells whereby certain of them assumed malignant characters. Askanazy himself inclines to the latter explanation, and regards the previous treatment with lipolytic substances as having something to do with this change.

A further observation made by Askanazy is that excision of the sexual organs in animals has no effect upon the subsequent development of teratoids. On the other hand, unilateral excision of the kidney in a series of animals led to a uniformly rapid development of tumours. Extirpation of the spleen had an exactly opposite effect. Out of 9 animals injected after extirpation 6 showed no growth at all, and in the other three slight growth only was observed.

As already mentioned, experiments were tried with whole embryos. These were implanted in the peritoneal cavity, and after the lapse of months the animals were examined. No tumour formation had occurred, but the embryo, still preserving its outward form, was found to contain a series of cysts lined by epithelium of various kinds.

To sum up, tumours macroscopically and microscopically resembling dermoids or teratomata can be produced by inoculating white rats with a mash of white rat embryo. Admittedly these tumours are not true dermoids. They arise from tissues already partly differentiated, and not, as is generally believed of the dermoid, from a single ovum or germinal blastomere. They may be regarded, as Askanazy puts it, as a sort of adopted daughter instead of a sister product. A number of interesting observations have already been made as to the con-

ditions under which these teratoids grow and as to factors which hinder or stimulate growth. It may be that further observation will throw light upon certain factors in connection with tumour growth in general.

NEW BOOKS.

Acromegaly—A Personal Experience. By LEONARD PORTAL MARK, M.D.
London: Baillière, Tindall & Cox. 1912. Price 7s. 6d.

THIS remarkable work must be of the deepest interest to everyone conversant with recent observations upon the ductless glands. Consisting as it does in a detailed account of the personal experiences of a trained observer suffering from acromegaly, it is undoubtedly unique.

The most valuable part of the work will probably be found by most readers to lie in the careful analysis and description of the symptoms as observed by the author himself. At the age of 24 he began to suffer from very varied symptoms connected with the head, such as tinnitus, photophobia, and drowsiness; but it was not until the age of 50 that the knowledge of his affection suddenly dawned upon him. He appears rather inclined to the belief that his condition may have been caused by early adventures after the fashion of the ante-natal misfortunes of Tristram Shandy. It is certainly true that many a cerebral tumour may be dated back to some accident to the head, yet it does not follow that acromegaly and gigantism are results of cranial compression.

The author dates the commencement of his symptoms from the age of 24, and it is really very remarkable how many of those who suffer from acromegaly have begun about that time of life to show objective appearances of the disease. In his youth he was evidently above the average in physical strength and hardiness. He mentions, for example, that without any training, at the age of 19, he ran one day a distance of two miles and 236 yards in fourteen minutes. Here, again, we have a circumstance which has been mentioned in connection with a large number of previous cases. In acromegaly it is very common to find great strength at, and soon after, adolescence, followed by rapid diminution of energy, so that by middle life the victim is reduced to a very weakly condition.

About the age of 30 Dr. Mark became subject to great suffering, on account of his inability to resist cold, and during the four succeeding years he constantly suffered from catarrh of the nares and fauces. When 35 years old he recognised the fact that there was a gradual advancement of the lower jaw, preventing the bite of the teeth, and at the same time he felt a quite extraordinary sense of fatigue, with an increase of the discomfort in the head. At the age of

37 he had a very bad attack of heart failure, and at that time, in consequence of some troubles connected with the teeth, he was diagnosed as suffering from acromegaly. His medical friends did not inform him of this diagnosis, treating him in the same tender fashion as was shown by Jenner in his solicitous consideration for the feelings of Hunter when suffering from anginous symptoms. When aged 38 the neuralgia, the eye and the throat symptoms reached a climax, and the author passed through what he calls his "black week." After suffering for some years more, a considerable amount of relief was obtained at the age of 42 by removal of the turbinate bones. Three years later his brother, returning from abroad, was struck by the alteration in his appearance. He himself about this time observed that his hat and gloves and boots seemed to have a wonderful tendency to shrink, but it never dawned upon him, when looking at the glass every day to shave his face and brush his hair, that there was any characteristic alteration in his appearance. In his fiftieth year, nevertheless, during the French medical visit to London, he was picked up in a crowd by Dr. Pierre Marie as a typical acromegalic. Immediately afterwards the knowledge suddenly struck himself.

The description of the various symptoms and appearances is detailed with dramatic force, and the volume is enriched by a series of pictures of its author, from the age of four to that of fifty-six. There are also skiagrams of the right hand and of the skull, along with an imprint of the right hand: a diagram of the skull from measurements taken by Professor Keith, and a photograph of the cast of the jaws and teeth, to show the change in the bite.

The various physical changes connected with the hands, feet, head and jaw, the teeth and the tongue, are fully detailed. A careful analysis of the troubles connected with the circulation, particularly the frequent tendency to cardiac failure, the irregularity of the heart's action, and the liability to thrombosis, receive careful attention.

The most interesting chapter in the book is probably the discussion on the causation of the symptoms, in which there is an attempt to discover the relative influence of mechanical variations due to the pressure of the growth at the base of the brain, or to the development of toxins from variations in pituitary secretion. We may well echo the wish expressed by the author that observations of the arterial pressure had been carried out at stated intervals throughout his affection. Such records would undoubtedly have been of the greatest use, and it would, further, have been most advantageous to have had careful estimations as to the functions of the other glands of the body.

As already mentioned, the work before us is perfectly unique, and every reader will probably echo the opinion that medical science has been placed under a debt of gratitude to Dr. Mark for his candid description of his own condition.

A System of Treatment. By many Writers. Edited by ARTHUR LATHAM, M.A., M.D.(Oxon.), L.R.C.P.(Lond.), and T. CRISP ENGLISH, M.B., B.S.(Lond.), F.R.C.S.(Eng). Four Volumes. I. and II., General Medicine and Surgery, pp. xxix., 1352, xxxviii., 1335; III., Special Subjects, pp. xxxiii., 1194; IV., Obstetrics and Gynæcology, pp. xxix., 883; Index, pp. 133. London: J. & A. Churchill. 1912. Price, each volume, 21s. net.

THE four volumes under review form a noteworthy contribution to medical literature. The third volume, dealing with special subjects, and the fourth, which is devoted to obstetrics and gynecology, will be considered separately: here we are concerned with the first and second, which are given up to treatment in general medicine and surgery. The index, it may at once be remarked, is copious (running to 33 pages) and well made: it refers to all the four volumes, and it is bound up with each volume. This is an excellent arrangement and will greatly facilitate reference, whilst it will at the same time show the extent of information available on any one subject.

Taking, then, the first two volumes for review here we note the arrangement of subjects. The mingling of medical and surgical matters, if rather disconcerting at first, soon becomes acceptable when it is realised how often nowadays a medical malady becomes one requiring surgical interference, and how so many so-called surgical affections have a medical side. At the same time we can guess that the editors had no little difficulty before they got matters arranged to their satisfaction. The first volume begins with "general subjects," amongst which we find, appropriately enough, the management of the sickroom, the general hygiene of infants and children, and surgical technique, but are rather surprised to meet with "tumours." Then follow the "infective diseases," but the editors have been forced to put a cross-reference to "tropical diseases," which are to be found in Volume III. Then come the "constitutional diseases" (a somewhat mixed lot, including scurvy), the "intoxications" (including sunstroke), "general injuries," "injuries and diseases of bones and joints:" and then the classification becomes largely a regional one ("diseases and affections of the lungs, the pericardium," etc., etc.) until near the end of the second volume, where we find such groups as "familial diseases" and "diseases of obscure origin characterised chiefly by disorders of motion." This brief survey of the classification of subjects shows the complexity of the matter, and gives an additional reason for the placing of the index at the end of each volume, an arrangement which enables the reader at once to find what he is looking for.

The list of contributors includes several well-known names, especially of physicians and surgeons south of the Tweed: we have noticed only one article by a Scottish surgeon, that, namely, on intussusception by Mr. Harold Stiles. One of the editors (Mr. Crisp English) is responsible

for all the articles on diseases and affections of the breast, Dr. Gordon Holmes writes on the various familial diseases (*e.g.* amaurotic idiocy, amyotonia congenita, Friedrich's disease, etc.), Drs. Maurice Craig and Macnamara on mental diseases, Mr. Mayo Robson on all the diseases of the pancreas and on several of those of the gall-bladder, Mr. J. W. Thomson Walker on the diseases and affections of the kidney, Dr. Herbert French on diseases of the blood, Mr. H. S. Pendlebury on several of the surgical affections of the thorax and its contents, and so on. Dr. Arthur Latham, the other editor, writes on bacilluria, bronchitis, pulmonary tuberculosis, acute rheumatic fever, vaccine therapy, etc.

The individual articles naturally differ considerably in importance, in length, and in value. A word of protest must be entered against the habit which prevails in these volumes of leaving vacant spaces at the end and sometimes at the beginning of each article, however short it may be. Thus the whole of page 1133 in the second volume is given up to a description of division of the posterior nerve roots of the spinal cord, and that description fills exactly twelve lines: peroneal muscular atrophy, with only fifteen lines, occupies another page. Since a full page holds forty-three lines it can be seen how much vacant space is to be found on the pages referred to. There are something like 153 articles in the first and 334 articles in the second volume, and the reviewer can hardly do more than sample a few of these. One of the longest and at the same time one of the best of these articles is that on the general treatment of diseases and affections of the heart by Dr. J. Mackenzie. It would be well if every medical man read what Dr. Mackenzie has to say about the difficulty in estimating the effect of remedies in heart cases: he is saying no more than the truth when he affirms that "it is marvellous that men trained in the exact sciences, and who can reason logically, appear to lose all sense of proportion and reality when they come to deal with remedies that are supposed to affect the organism." He instances digitalis given in doses of from two to five minims, with a result said to be detected in a few minutes. Another long, fully-illustrated, and up-to-date article is that by Mr. Arbuthnot Lane on the operative treatment of fractures: one is almost embarrassed by the number of figures which accompany this chapter. Among the shorter articles we may refer in passing to that on hydronephrosis, in which the various surgical procedures (pyeloplication, resection of renal pelvis, orthopaedic resection, and pyelo-ureteral anastomosis of different kinds) are briefly but clearly indicated: on chorea, in which the aspirin treatment is highly spoken of: and on the surgical treatment of colitis, in which caecostomy and appendicostomy are critically examined and described. With regard to the newer methods of treating nervous disorders, we note that although "Freud" or "Freudian method" does not appear in the index, it is described in the text in the article

on hysteria, where psycho-analysis, the association method, and dream-analysis are carefully estimated. In connection with tetany the use of parathyroid substance is referred to, but it is not named under paralysis agitans, although pituitary extract is noted. The treatment of the brawny arm of cancer of the breast by lymphangioplasty is fully described and praised, but the necessary warning that not all cases of brawny arm are suitable is wisely added.

On the whole we can speak in terms of approbation of *A System of Treatment*. The articles have in the great majority of cases been carefully written by authors competent to deal with them; the illustrations are sufficient and are really useful in elucidating the text; the editorial work has been well done; and the publishers have turned out the volumes handsomely.

Handbook of the Technique of the Teat and Capillary Glass Tube and its Applications in Medicine and Bacteriology. By Sir A. E. WRIGHT, M.D., F.R.S. Pp. 208. London: Constable & Co., Ltd. 1912. Price 10s. 6d.

IN this volume Professor Wright presents to his readers the manifold applications of the capillary pipette to the routine of a bacteriological laboratory. Many of these are highly ingenious, and all give results of sufficient accuracy with an enormous saving of time and labour. In the first part of the book the methods of making all the necessary apparatus from glass tubing are dealt with. This is followed by a chapter dealing with the general principles of the manipulation of the pipette. After this follows the applications of this system to the various estimations which might have to be undertaken in a clinical laboratory. Of these the best known and most fully described is the method for the estimation of the opsonic index. The methods advised up to the point of the preparation of the leucocytic film are accurate, but when the counting of the phagocytosed organisms is being done the personal element comes into play and cannot well be avoided even by the means suggested. It is impossible to have two codes of "morality"—one for the first part of the experiment and one for the second.

The method used for the dilution in the agglutination experiments is efficient and very simple. The many fallacies which are apt to creep in when the estimation of the coagulation time of the blood is being carried out are taken up separately and the means by which they can be avoided are clearly shown. Probably the most ingenious method is that of testing the bactericidal power of the blood serum.

The book concludes with a chapter on the preparation of bacterial vaccines. The same difficulty occurs in the standardisation of the

vaccine as in the counting of an opsonic film—the personal factor occupies too prominent a position.

The description all through the book is such that anyone with laboratory experience can easily learn and carry out the methods described. The book is well printed, the arrangement convenient, and the illustrations show clearly each point referred to in the text.

Direct Laryngoscopy, Bronchoscopy, and Esophagoscopy. By Dr. W. BRÜNINGS. Translated and edited by W. G. HOWARTH, M.A., M.B., B.C.(Camb.), F.R.C.S.(Eng.). Pp. xiv., 370. 114 Illustrations. London: Baillière, Tindall & Cox. 1912. Price 15s. net.

THIS work is not merely a translation of Dr. Brünings' well-known work, for at Dr. Howarth's suggestion Dr. Brünings has added sections dealing with the clinical application of these methods, with the result that about one-third of the matter in this book is entirely new, and the value of the work has undoubtedly been greatly enhanced. To obtain this space the first section of the book on theoretical considerations underlying the construction of endoscopic instruments has been omitted.

The section on direct operations on the larynx has been completely rewritten. The main obstacle to direct operative work on the larynx has been overcome by Brünings' counter-pressure method, which allows the use of both hands for the operation. Among the procedures which are detailed in this chapter is a method of injecting paraffin into the paralysed cord in cases of recurrent paralysis. Dr. Brünings states that he has had excellent results in three cases.

A new chapter has also been added on bronchoscopic operations and methods of treatment. In it a most interesting and instructive account is given of the diagnosis and treatment of bronchial foreign bodies. The translation has been carefully carried out, the book is well illustrated and printed (except that the author's name is incorrectly printed on the title-page), and it should be in the possession of all who are interested in this branch of surgery.

On Gastroscoy. By WILLIAM HILL, B.Sc., M.D.(Lond.). Pp. 46. London: John Bale, Sons & Danielsson, Ltd. 1912. Price, 3s. 6d. net.

DR. HILL reviews shortly the history of gastroscopy and gives an account of various of the instruments which have been devised for this purpose, and very rightly condemns the dangerous practice of passing blind rigid tubes into the stomach. He then describes the method, suggested by

himself and elaborated by Dr. Herschell, of first passing a direct vision oesophagoscope, followed by inflation of the stomach and the introduction of an indirect vision periscope, through the outer tube. The technique of the method is fairly fully described and some interesting illustrative cases are quoted. We agree with Dr. Hill that his method has an assured field of usefulness in many morbid conditions of the stomach, and that gastroscopy can no longer be neglected by those who lay claim to be considered gastric experts. The book is freely illustrated, and there is a plate of gastroscopic appearances as seen and sketched by the author.

The Treatment of Fractures by Mobilisation and Massage. By JAMES B. MENNELL, M.D., B.C.(Cantab.), etc. With an Introduction by Dr. J. LUCAS CHAMPIONNIÈRE, Chirurgien Honoraire de l'Hôtel Dieu, etc. Pp. 458. London: Macmillan & Co. 1911. Price 12s. net.

THIS is the only book in English in which a good account is given of Professor Lucas Championnière's method of treating fractures by massage and movement.

The writer is an enthusiastic follower of that famous surgeon, and has studied his method in Paris. Mr. Mennell has also had much experience in applying the treatment at St. Thomas' Hospital, although, unfortunately, most of his cases seem to have been in the out-patient department, and he is unable to speak authoritatively as to the value of the method in fractures of the femur.

The book is divided into two sections, the theoretical and the practical. In the first, although the necessary information is given, the author is too diffuse, and allows himself to be drawn into side issues. In the second a good account is given of the method of treating individual fractures, especially those likely to be met with in an out-patient department.

The book will serve a useful purpose in helping to diffuse among surgeons and teachers a wider knowledge of Professor Lucas Championnière's invaluable method of treatment, but we fear that it is not sufficiently concise and comprehensive to meet the requirements of the average general practitioner.

Tuberculin Treatment. By Dr. HERMANN SAHLI. Translated from the Third German Edition by W. B. CHRISTOPHERSON. Pp. i.-viii., 1-198. London: John Bale, Sons & Danielsson, Ltd. 1912. 7s. 6d. net.

FEW physicians have greater claims to be listened to with respect than Professor Sahli of Berne, and in so difficult a therapeutic

problem as the value of tuberculin his matured opinion carries more weight than any tabulated list of sanatorium "cures." He is a strong advocate of tuberculin treatment, provided the remedy is cautiously used, so as to provoke no reaction whatever. In this volume the technique of administering Béraneck's tuberculin is very carefully described, and after reading what the author has to say we are left with the impression that, provided the instructions are followed, no harm can result from the treatment. This is a great matter, because tuberculin administered on Sahli's plan can be used in a greater variety of cases than is generally considered safe with the less accurate methods generally in vogue. For this reason, and also because it is, so far as we know, the only complete guide to the use of Béraneck's tuberculin, we believe that Sahli's *Tuberculin Treatment* will have a cordial reception in this country.

Tuberculin Treatment. By CLIVE RIVIERE, M.D.(Lond.), F.R.C.P., and EGBERT MORLAND, M.B. and B.Sc.(Lond.), M.D.(Bern). Pp. 277. London: Henry Frowde and Hodder & Stoughton. 1912. Price 5s. net.

THE authors state "the chief and central aim of their book is to take tuberculin treatment out of the field of doubt and controversy and to place its principles and practice alike on a firm basis." Whether they entirely succeed in this object or not is open to doubt, but there is no doubt that their volume is a most valuable addition to the literature on the subject, marked as it is with a sense of broad perspective somewhat rare in such treatises.

In Part I. "The General Lines of Tuberculin Administration" are dealt with, including the choice of a tuberculin, the standard of dosage, the route of administration, and many other subjects. Part II. deals with "The Method of Immunisation with Tolerance (Koch). The Treatment of Auto-toxic Tuberculosis." The writers recommend this method of treatment—large doses—more especially in cases of pulmonary disease in adults. "The Method of Immunisation without Tolerance (Wright). The Treatment of Localised Tuberculosis" is dealt with in Part III., and it is stated that this method "may be summed up shortly as the small-dose method, at long intervals, suitable to localised tuberculosis, and especially to tuberculosis in children."

The book impresses as a careful, practical, and well thought-out study of the whole subject.

NEW EDITIONS.

Deformities, including Diseases of the Bones and Joints: A Text-Book of Orthopædic Surgery. By A. H. TUBBY, M.S.(Lond.), F.R.C.S. Second Edition. Two Vols. Pp. 883, 867. 70 Plates. Over 1000 Illustrations. London: Macmillan & Co., Ltd. 1912. Price 45s. net.

ALTHOUGH nominally a second edition, this is really a new work, and in its more extended form it embraces the surgery of the entire locomotor apparatus. The author has adopted an arrangement of the subject-matter based on etiology and pathology in preference to a purely regional grouping. Although defensible on grounds of logic, and calculated to facilitate a comprehensive discussion of each variety of deformity, this method has certain disadvantages from the clinical point of view. These, however, are largely discounted by the provision of a full index of subjects.

The first volume includes deformities of congenital origin, congenital dislocation of the hip and the various forms of congenital club-foot being described most fully. A large section is devoted to static deformities, and a shorter one to affections of muscles, tendons, bursæ and fasciæ.

In the second volume, which deals exhaustively with diseases of the bones and joints and paralytic deformities, special attention is paid to the means taken to prevent the occurrence of deformities.

We can cordially recommend this work as a most complete and authoritative exposition of the subjects with which it deals. It is profusely illustrated, the figures, although unequal in artistic merit, being admirably selected to elucidate the text.

Manual of Operative Surgery. By JOHN FAIRBAIRN BINNIE, A.M., C.M. (Aberdeen), Kansas City, Mo. Fifth Edition. Roy. 8vo. Pp. 1153. With 1365 Illustrations. London: H. K. Lewis. 1912. Price 30s. net.

WE expressed a favourable opinion of this work when it first appeared, and each subsequent issue has justified our estimate of the book and our expectations for its future. The fifth edition now before us is published in one volume, and contains a most useful summary of present-day operative surgery. The author describes in detail all the classical operations, and furnishes a concise summary from original sources of all the most recent operative procedures.

The descriptions are so clear, and the essential details are given in such a workman-like manner, that we overlook the abruptness of the writing and the absence of literary style.

The work is admirably adapted to meet the requirements of the young operating surgeon or the student preparing for the higher surgical examinations. Its usefulness for undergraduates is limited to some extent, however, by the numerous methods described to attain a given object and the absence of criticism of the different methods cited.

The illustrations, mostly borrowed, are not up to the standard of modern works on operative surgery, and the absence of legends is inconvenient.

Common Disorders and Diseases of Childhood. By GEORGE FREDERIC STILL, M.D., F.R.C.P. Second Edition. Pp. xiv., 813. London: Henry Frowde and Hodder & Stoughton. Price 16s. net.

THE appreciation with which Dr. Still's work has been received is shown by the issue of a second edition in little more than two years from the first appearance of his manual. In this edition new chapters have been added on adenoids, asthma, hydrocephalus, and epilepsy, and acute pyelitis, formerly dealt with in the chapter on fever, now stands by itself. There are also a number of minor additions, among them a sceptical note on the value of seawater injections, and a warning against treating syphilitic infants with salvarsan: a paragraph on family jaundice, and a hint on the use of glucose injections in cyclic and other forms of vomiting. The results of recent work on acute poliomyelitis have necessitated considerable alterations in the chapter on that disease. One unaccountable omission still remains: there is no allusion to that form of chronic arthritis with which the author's name is specially identified. The fact that "revision" has implied practically nothing except the incorporation of new matter, and that little or nothing of the old material has required modification or excision, shows how carefully the book was prepared in the first instance. The new edition is very welcome.

Diseases of the Eye. By M. STEPHEN MAYOU, F.R.C.S. Second Edition. Pp. 296. Oxford Medical Manuals. London: Henry Frowde and Hodder & Stoughton. 1912. Price 5s.

THOSE who require a short work on diseases of the eye will find themselves well served by the present volume, bearing in mind the author's proviso that it does not profess to deal fully with the theory of refraction. It contains a large amount of information, is well illustrated, and, though necessarily condensed, forms a very readable and practical handbook, while its value is further enhanced by appendices dealing with prescriptions and the standards of vision required in various services. Such points as call for criticism are practically confined to the chapters on methods of examination and on optics and refraction,

which hardly come up to the general standard of the work. In dealing with ophthalmoscopic examination by the indirect method the observer is advised to place himself at the inconvenient distance of a metre from the patient, while the image seen is stated to be virtual instead of real. The method advised for the estimation of the size of central scotomata certainly does not do what is claimed for it. In the second chapter, in describing the visual angle subtended by Snellen's types, seconds have been written for minutes. The illustration of the shadow in retinoscopy is not happily chosen.

With the exception of these and a few other minor defects the book is excellently adapted for its purpose.

A Laboratory Text-Book of Embryology. By CHARLES SEDGWICK MINOT, LL.D., D.Sc. Second Edition, revised, with 262 Illustrations, chiefly original. London: J. & A. Churchill. 1911. Price 16s. net.

THIS new edition of Professor Minot's well-known text-book has been extensively revised, the figures have been increased in number—from 218 to 262—and a considerable number of the illustrations of the first edition have been replaced by new ones. The well-executed figures form a striking feature of the present edition, especially noteworthy being several excellent drawings of reconstructions of embryos and their organs.

From the student's point of view it would have been better if several of the subjects considered in the first chapter—*e.g.* glands and their classification, germ-cells, sex, heredity—could have been more fully treated.

With the exception of one chapter, of about forty pages, on the young stages of the chick (up to the time when three gill-slits are present), the course of study given in the book is limited to mammalian embryology. The chief phases of development are traced in pig embryos. One chapter, of forty pages, is devoted to the description of human embryos, and another section of similar length to the consideration of the structure of the human uterus and foetal appendages at different stages.

The concluding chapter gives useful information on methods, including the preservation of material, the preparation of sections, staining, mounting, and reconstruction. In the description of the method of reconstruction there is, however, no reference to means for aiding accurate superposition of the wax plates which are to form the model, *i.e.* guide-lines or other equivalent indicators are not suggested.

The volume offers to the student clear guidance to the means of acquiring a sound working knowledge of the chief points in mammalian development.

Embryology, Text-Book of. By F. R. BAILEY, A.M., M.D., and A. M. MILLER, A.M. Second Edition. Pp. 672. Price 21s. net.

THE early call for a new edition of this text book is sufficient guarantee of its utility to students, and as the second edition has been brought well up to date there is little doubt that it will retain the favour gained by its predecessor. The success of the book is well deserved, for the authors have set forth the main facts of embryology in a clear and definite manner. It is possible that they have incorporated in their book a little more information than may be necessary for the average medical student, for whom it is primarily designed: but they have been so wise in their selection and have arranged their facts and suggestions so well that the way of the hard-pressed student is rendered comparatively easy. As a matter of fact though the book looks large it does not contain a very great amount of text, for much of the space is occupied by numerous and very good illustrations, which greatly facilitate the comprehension of the subject.

Manual of Pathology, including Bacteriology. By W. M. LATE COPLIN, M.D., Professor of Pathology, Jefferson Medical College, Philadelphia. Fifth Edition. Pp. 1139. Illustrated (612 Black and White; 12 Plates—11 in Colour). London: J. & A. Churchill. 1912.

ALTHOUGH in his preface the author states that this volume is intended to be "not a treatise or book of reference, but, as its title indicates, a manual that the author hopes may be useful in the laboratory and post-mortem room and in clinical diagnosis," the book, consisting of some eleven hundred closely-printed pages, is really intermediate between a text book for students and a work of reference for the pathologist. The ordinary student will be apt to find it rather too full for his purpose, whilst the expert naturally prefers to go straight to the original authorities. Nevertheless, the more advanced student and the more junior laboratory worker may find the book useful. The text is clearly written and shows evidence of comparatively wide reading, the references to literature being useful and up to date. As regards his subject-matter, the author is a little too prone to follow tradition and to neglect the results of more recent research, *e.g.* in his treatment of the subject of infarction—a tendency also to be observed in his illustrations. These are numerous, but very unequal in quality. The majority are borrowed from other works, and some of them have suffered considerably in the process: for example the condition of granular contracted kidney, beautifully portrayed in Fasciculus I., Plate III., Fig. 6, of the New Sydenham Society's *Atlas*, becomes scarcely recognisable as the same condition when seen in

Plate X. Fig. 1, in the book under review. Many of the illustrations, especially the newer ones, are good, and the book would really gain if the numerous inferior, and in some instances useless, blocks were cut out. Many have a distinctly antiquated look: for example, Figs. 145, 162, 163, 167, 169, etc., and various very primitive illustrations of bacteria; and a few, *e.g.* Fig. 128, repeated later as Fig. 311, convey no information even to an eye accustomed to interpreting all varieties of pathological illustrations.

That the book fills a want, however, is evidenced by its having reached a fifth edition, though we cannot help feeling that the writer would have been wiser if he had not attempted to cover such a wide field, endeavouring to combine, as he does, the subjects of general, special, and clinical pathology, general and clinical bacteriology, and post-mortem and general laboratory technique within the scope of a single volume.

Clinical Diagnosis. By JAMES CAMPBELL TODD, Ph.D., M.D. Second Edition Pp. 469. Philadelphia: W. B. Saunders Co. 1912. Price 10s. 6d. net.

THIS work deals essentially with the various laboratory methods of use in clinical medicine, but has been considerably expanded since the first edition in 1908.

The correct way to obtain each sample, and its subsequent examination by physical, microscopic, and chemical means, are clearly laid down, the steps in the latter being distinct and numbered. Many alternative methods are given, and special processes, such as those for the Cambridge pancreatic reaction and the Wassermann test, are described. The findings in the various pathological conditions are stated, and the illustrations are good and useful. There is a full chapter on animal parasites, including their life-histories, and the book ends with a chapter on bacteriological methods, and one on the preparation and use of vaccines.

Although the work is an excellent one there is nothing specially to recommend it in preference to the clinical handbooks most popular in this country at present, except perhaps as an adjunct to the library of a hospital sideroom.

Principles and Practice of Physical Diagnosis. By JOHN C. DA COSTA, Jr., M.D. Second Edition. Pp 557. London: W. B. Saunders Co. 1911.

THE first edition of this book appeared in 1908 and has been quickly followed by two reprints and now by a revised edition. Its popularity is well deserved. Although the principles and physical methods applicable to the study of thoracic and abdominal diseases alone are dealt with, the limitation is neither artificial nor disadvantageous.

Space is provided for adequate consideration of the subject within reasonable limits, and the book is at once a convenient handbook and a fairly complete exposition of physical diagnosis. New matter has been incorporated, chiefly in connection with the subjects of sphygmomanometry, nodal rhythm, pleurisy, lobar atelectasis, and a number of new illustrations also appear.

The book is one which should commend itself to practitioners and students.

NOTES ON BOOKS.

SCHAMBERG'S *Diseases of the Skin, etc.* (Saunders), contains 556 pages, of which 140 are devoted to the eruptive fevers (small-pox, measles, etc.). The author advocates this combination in his preface, but we do not think he will make many converts. The book contains interesting articles on grain itch, the nature of which the author was the first to recognise, on vaccination and cutaneous diseases, and a number of excellent photographic reproductions of disease. With many of the statements made we find ourselves in frank disagreement, but surely the author ought to know that Crocker has been dead nearly three years, and should not be spoken of in the present tense.

It is gratifying to know that sanitation is now one of the subjects for the promotion examination of army subalterns. Major K. B. Barnett's *Handbook on Military Sanitation for Regimental Officers* (Forster, Groom & Co., price 2s. 6d.) can be most conscientiously recommended to their notice. It contains in a brief and attractive form all the practical information which they are likely to require regarding the cause and prevention of the chief preventable diseases. There are excellent chapters upon sanitation in camps, in barracks, and on the line of march; the food of the soldier is most adequately discussed, and there is a useful appendix containing papers recently set at examinations for promotion. Those regimental officers who are inclined to underrate the importance of the subject will do well to study the interesting introduction contributed by so practical a soldier as General Smith Dorrien.

The subjects treated in *Some Factors Influencing Health in Tropical and Subtropical Countries*, by T. Gerald Garry, M.D. (Bale, Sons & Danielsson, price 2s. 6d. net), cover a wide range, including hints on the type of man or woman suitable for work in the tropics, the influence of a proper selection of food, drink, and clothing and general measures to be adopted for the preservation of health.

Medical readers will find in it many technical errors, while lay

readers will experience some difficulty in grappling with the technical terms so freely employed.

The proprietors of the many beverages (including wines and whiskies), patent foods, and other proprietary articles mentioned in the book may find it of interest, but owing to the sketchy manner in which the various subjects are treated we cannot recommend it to the notice of our readers.

Clinical Lectures on the Acute Abdomen, by W. H. Battle, F.R.C.S. (Constable & Co.), is in the main concerned with the beneficial results of early operation in acute abdominal affections, but it contains much more to interest alike the surgeon and the practitioner. The general descriptions are valuably supplemented by the records of many typical and atypical cases, and the treatment advocated throughout is based on a simple technique. The seven lectures deal with the appendix, perforations of the digestive tract, acute intestinal obstruction, diseases of the female generative organs, the rarer causes of the acute abdomen, and some neuroses which may cause symptoms of urgency. The book is likely to prove valuable to the practitioner in diagnosing and estimating the gravity of a case of sudden abdominal disease.

Die Störungen des Verdauungsapparats als Ursache und Folge anderer Erkrankungen, by Dr. Hans Herz (Berlin, S. Karger), is a somewhat discursive book which must originally, and also for the purposes of revision, have entailed an enormous amount of work upon the author. This first part of the second edition will amply repay careful perusal. It gives a detailed account of the relationships, causal and consequential, of the alimentary tract to diseases of the blood, to diseases of the glands, and to the group of diseases often termed constitutional.

In the preface the author deplores the numerous inaccuracies perpetrated by writers misquoting original experiments, theories, and statements. He seems to have taken pains himself by exhaustive reading to avoid such misstatements, and a copious bibliography bears witness to this. We have read with interest and profit many sections of the book, which is written in a style presenting no difficulty to anyone possessing a moderate knowledge of German. We note that the author does not adopt enthusiastically the modern views regarding the pathology of pernicious anemia, but from the wide field covered it is impossible, unless in a very lengthy review, to offer much criticism.

In this volume of *International Clinics* (Vol. IV., 21st series, Philadelphia, 1911) there are many good papers. First come five papers on treatment—"Enuresis," "Prophylactic Treatment of Hypertrophy of the Prostate," "Agar-Agar in the Treatment of Constipation and of Diarrhoea," "Kerosene as a Remedial Agent in Dysentery," and

the "Modern Treatment of Syphilis." Second, come papers on "Senile Degeneration," and on "Senile Mentality." Three papers on diagnosis come next, then four on medicine, including one on "Empiricism and Modern Medicine" by Sir Dyce Duckworth, another on "Habit, Symptoms, and Disease," by Adami. Three papers on surgery include one on "Intestinal Surgery," "A Clinical Review" by Morgan Vance, and one on the "Operation for the Radical Cure of Inguinal Hernia" by Macmillan of Detroit. Then follow papers on otology, pediatrics, ophthalmology, a medico-legal one by Frink, two on the "Economics of Medicine," and the volume closes with a paper on the history of medicine, "Edward Jenner, the Man," by Dr. Walter Jennings.

The volume is well illustrated, the frontispiece being an engraving of Jenner.

Outlines of Early Development for Obstetric Students, by R. W. Johnstone, M.A., M.D., F.R.C.S., M.R.C.P.E., with a preface by Sir J. Halliday Croom (John Currie, 1s. 6d. net). Dr. Johnstone has brought together in the short space of 23 pages the essential facts of the development of the human ovum so far as these require to be known by the student of obstetrics. This is a subject which has always given great trouble to teacher and student alike, and both will welcome this concise description of the various phases the ovum goes through from fertilisation to the full-time product. Written for students of obstetrics, it naturally deals more particularly with the development of the membranes and placenta. The book admirably fulfils the purpose for which it is intended.

A Guide to the Series of Pathological Specimens Illustrating Injuries and Diseases of the Organs of Generation in the Female in the Museum of the Royal College of Surgeons of England, by Alban H. G. Doran (Taylor & Francis, price 6d.). This small publication is not only a catalogue of the gynecological specimens in the Royal College of Surgeons' Museum, London, but, describing as it does many of the more important preparations, it is a guide to the whole subject of gynecological pathology. Alban Doran has done his work admirably and has judiciously selected the illustrations. The book will prove invaluable to anyone engaged in the study of this special subject.

Minor Surgery, by L. A. Bidwell, F.R.C.S. (University of London Press, price 6s.), is the second of the London Practitioners' Manuals to be published, and augurs well for the excellence of this series if the same high standard be maintained in future volumes. The author has achieved his purpose of giving simple and clear directions for the management of everyday surgical work. The subject matter is com-

prehensive and up to date, and the illustrations are well chosen. The many practical hints are the evident outcome of a large experience, and the paragraphs on treatment after operations are typical of the admirable common sense that is one of the outstanding merits of this book.

When a book reaches its seventh edition its success goes without saying. Dr. John C. Thresh's little brochure, *A Simple Method of Water Analysis* (J. & A. Churchill, price 2s. 6d. net), has filled a gap, and by being kept up to date has maintained its place in the confidence of public health officials as well as those who are interested in water supplies.

The Prescribing of Spectacles, by Archibald Stanley Percival, M.A., M.B., B.C.(Cantab.) (John Wright & Sons, price 5s. 6d. net), is a really valuable little book, and we are pleased to note the appearance of a second edition. Mr. Percival's mathematical training, special knowledge of optics, and wide practical experience have enabled him to write a highly instructive book which handles a well-worn theme with much freshness and originality.

Treatment of Tuberculosis and Lupus with Allyl Sulphide, by William C. Minchin, M.D. (Baillière, Tindall & Cox, price 3s. 6d. net). The therapeutic use of garlic is not new; from the earliest times many virtues have been attributed to it. Dr. Minchin gives an interesting account of its beneficial effects in several cases of tuberculosis, both pulmonary and osseous, as well as in lupus.

Given either as garlic or in the form of the active principle, allyl sulphide it is not likely to come into general use owing to the strong disagreeable odour emanating from the patient using the drug.

Immediate Care of the Injured, by Albert S. Morrow, M.D. (W. B. Saunders Co., price 12s.), is a book which can be thoroughly recommended to the serious student of first-aid work. The language is simple and non-technical, the subject-matter well arranged and adequate in scope, while the illustrations are numerous, helpful, and distinctly above the average standard found in similar works. In issuing this, the second, edition the publishers have done their part well, as the book is printed in large clear type on good thick paper and is strongly bound.

The Red Cross Manual of First Aid and Stretcher Drill, by D. M. Macdonald, M.D. (George Gill & Sons, Ltd., price 1s.), contains a good epitome of the knowledge considered necessary for the first-aid worker. The range of subjects is very complete, the matter sound, and the illustrations useful. Each chapter is preceded by a few hints to the lecturer, and is finished with a few questions for the students.

There are, however, too many instances of loose grammatical construction, and the repeated spelling of "waggon" first with one "g" and a few lines further on with two "g's" is perhaps carrying compromise too far.

The Prescriber (Vol. V. 1911) summarises the year's progress in therapeutics, and should be of service to the busy practitioner. Brief notes are given of new remedies, with textual references to the original papers. Other features are a good index to current literature on treatment, original communications by Sir James Sawyer and others, and three articles on the mineral waters of Great Britain.

NEW PREPARATIONS.

Novaform.—This preparation is introduced as a substitute for iodoform, one of the advantages claimed for it being that it is odourless. It is a combination of bismuth oxide, with tetra-pyrocatechin, an aromatic antiseptic containing bromine. In offensive wounds we have found it non-irritant, exsiccative, and an excellent deodorant.

The *Ecsolent preparations*—ointment, dusting powder, and soap—have been found highly efficacious in allaying irritation in eczema, prurigo, and other irritative skin affections. They have an agreeable odour, derived from the ingredients employed in their preparation.

BOOKS RECEIVED.

- ADAMS, P. H. Pathology of the Eye (*Leeds, Hoelder & Stroughton*) —
 BYTHELL, W. J. S., and A. E. BARNLEY. X-Ray Diagnosis and Treatment (*Leeds, Hoelder & Stroughton*) —
 CRANDON, L. R. G., and A. EHRENFRIED. Surgical After-Treatment. Second Edition (*W. B. Saunders Co.*) 25s.
 CURRIE, J. R. Annual Report on the Health and Sanitary Condition of the County of Fife during 1911 —
 GREEN, C. E. The Local Incidence of Cancer (*Wm. Green & Sons*) 1s.
 GRULEE, C. G. Infant Feeding (*W. B. Saunders Co.*) 13s.
 LEWIS, A. H. N. Diseases of Women. Seventh Edition (*H. K. Lewis*) 12s. 6d.
 LOWRY, E. B. False Modesty (*Forbes & Co., Chicago*) 50 cents.
 LOWRY, E. B. Herself—Talks with Women Concerning Themselves (*Forbes & Co., Chicago*) 1 dol.
 LOWRY, E. B. Truths—Talks with a Boy Concerning Himself (*Forbes & Co., Chicago*) 50 cents.
 LOWRY, E. B. Confidences—Talks with a Young Girl Concerning Herself (*Forbes & Co., Chicago*) 50 cents.
 SIBLEY, W. K. The Treatment of Diseases of the Skin (*Edward Arnold*) 5s.
 STORR, F. R. La Maladie du Sommeil au Katanga (*Constable & Co.*) —
 THE Surgical Clinics of John B. Murphy, M.D. Vol. I., No. 2 (*W. B. Saunders Co.*) —
 TRANSACTIONS of the American Pediatric Society. Vol. XXIII. (*Scientific Press, Ltd.*) —
 TRANSACTIONS of the American Urological Association, 1911. Vol. V. Edited by C. G. CUSTUM —
 VECKI, V. G. Sexual Impotence. Fourth Edition (*W. B. Saunders Co.*) 10s. 6d.
 WILLEY, F. E. Diseases of Women (*Scientific Press, Ltd.*) 2s.
 WOOLACOTT, F. J. The NURSING of Patients with Diseases. Second Edition (*Scientific Press, Ltd.*) 2s. 6d.

EDINBURGH MEDICAL JOURNAL.

EDITORIAL NOTES.

Memorial to Lord Lister. SCOTLAND will ever be proud that Lister's work for humanity was done within her borders, and the time has come when Scotsmen must take steps to express their gratitude as well as their pride that this country was privileged to be the scene of the most beneficent revolution in the history of the healing art.

There is no need to raise monuments to perpetuate Lister's fame. That may be allowed to look after itself. His work will for ever stand as his monument. The name of Lister has been enrolled among the immortals, and nothing that we who follow him may do can increase or diminish its lustre by one iota.

We shall fail, however, in our duty to ourselves, to our country, and to the profession which Lister ennobled if we do not embrace this opportunity of linking his name with some benevolent movement which will carry on the work he had at heart—the alleviation of human suffering.

We say "carry on the work" advisedly, because we feel that we shall best perpetuate Lister's memory, and shall do it in what is perhaps the only way that he himself would have approved, if, following his example, we endeavour to solve some of the problems of disease by means of scientific research.

There are many ways in which such an idea might be carried into effect, and it is too soon to attempt to elaborate any of these. One which at first sight seems to suggest itself as eminently appropriate is the establishment and endowment of a Scottish Lister Research Institute, organised on a truly national basis, and under a board of management representative of every part of the country.

The sum necessary for such a scheme would be very considerable, but the occasion is a great one, and we feel sure that an appeal made by the Scottish Universities, the Royal Society and other learned bodies, the Royal Medical Corporations, and the leading civic authorities throughout the land would meet with a response from Scots at home and abroad which would be ample.

We understand that steps will be taken early in the autumn to inaugurate some such movement as we have adumbrated, and we trust our readers will give it their cordial support.

**Fish and Typhoid
Fever.**

THE Report of the London County Council is not a volume to which a lover of detective stories would naturally turn, yet the investigation of a recent typhoid epidemic by Dr. Hamer vies in point of interest with some of the deductive achievements of Sherlock Holmes. In the autumn of 1910 there was an unusual prevalence of typhoid fever in East London, and on inquiry it was found that small local outbreaks had simultaneously occurred in other districts. About 200 cases, over and above the normal average, had to be accounted for. The patients, with few exceptions, belonged to the poorest class. It was possible to exclude water, milk, spread by personal contact or by carriers, visits to the hop fields of Kent and seaside resorts, and bathing, from the possible causes, and the likely channels of infection were finally narrowed down to two articles of food—mussels and fried fish. The mussel hypothesis was not, *à priori*, improbable, for in past years suspicion had fallen on both mussels and cockles: it was, however, put out of court by the discovery that many of those infected had not eaten mussels, while in several instances in which the shellfish had been eaten only one member of a family suffered. In striking contrast stood the facts as to fried fish. Out of 50 cases in the Bethnal Green area (which was specially studied) all except one gave a history of eating fried fish, and that one was an erroneous notification; moreover, in multiple house-invasions the suspected fish had been partaken of *en famille*. The fried fish hypothesis was accordingly tested further, and a number of interesting facts were brought to light. An estimate was made of the proportions in which a chance selection of the fried fish shops in the area would be made by a random sample of the population, and this was compared with the shops actually named by those who contracted typhoid. In the result 3 shops were actually named—out of all proportion to the probabilities of the case. These 3 shops drew their fish supply from two sources in Billingsgate. A more extended investigation of the fish-eating habits of the patients in other local epidemics showed that these could be grouped into 31 clusters, centring round 24 shops and 7 market streets, in which, presumably, a single stall was at fault. These 31 retail supplies were curiously related. All came from Billingsgate, and having in view the fact that a quite considerable percentage of small retailers get fish direct by rail from the coast, it is extremely unlikely that it was by mere chance that none of the 31 were so supplied. Of Billingsgate fish, two-thirds is rail- and one-third steamer-carried. The 31 shops all sold steamer fish, and not only that, but a special cheap quality of it ("late steamer fish"), which does not exceed one-tenth of the total sold at Billingsgate. The fish under suspicion in these shops consists of small plaice or dabs. Having limited the probable infective agent to this fish, the question arises as

to how it is contaminated. It is infected before it reaches the retailer, and there is no evidence of its being infected in transit from Billingsgate to the shops. The facts of the case, however, go to show that the fish are infected in rivers and estuaries, and that imperfect gutting is an important factor in transmitting the disease. In the first place, the fish sold in these poor localities consists largely of small, immature, and therefore cheap, plaice and flounders. These flat-fish are practically the only fish used by vendors of fried fish which are not gutted at sea, the reason being that the nature of their food (small shellfish) makes it possible to retain the gut without injury to the fish. In the second place, large quantities of immature fish of these species are trawled from the nurseries in the shallow inshore waters off Denmark and the mouth of the Elbe. These small flat-fish frequent tidal waters, and ascend estuaries or even slow rivers; thus the possibility of contamination with *B. typhosus* is not remote. The decisive link in the chain of proof—actual demonstration of the bacilli—is wanting, but the circumstantial evidence worked out by Dr. Hamer is fairly strong. Should his hypothesis be verified, it would be but one more instance of how “animals, remote in the scale of nature, are bound together by a web of complex relations.” Darwin, whose words these are, illustrated them in a well-known passage of the *Origin*, by showing that the amount of red clover and heartease in a district might depend on the number of cats. To fertilise the flowers the humble bee is needed: its enemy is the field mouse. Where cats abound there field mice are few. In the same way may be correlated the fact that plaice live on small shellfish with the incidence of typhoid among dwellers in East London. The practical outcome of this very interesting epidemiological study is that in the interest of public health ungutted plaice ought not to be exposed for sale in the market. The question of legislating with a view to limiting the destruction of small plaice, which has received much attention in recent years, may also prove important from the epidemiological as well as the industrial aspect.

The Local Incidence of Cancer.

THAT the topographical distribution of cancer is extremely variable is well known. The question of so-called “cancer houses” can scarcely be held as settled one way or another, though at present, probably, the balance of opinion is against their existence. It has, however, been repeatedly shown that there exist extraordinary differences in the prevalence of cancer in different urban and rural areas, and this has never been satisfactorily explained. Attempts to correlate these variations with meteorological, geological, or industrial conditions, with the age distribution of the population, with the existence of large hospitals or other artificial factors, have always failed. If we are ever to arrive at a solution of the problem, it is apparent that it must be the object of widespread, minute, local inquiries in amplification of the results of general

statistical investigation. Some recent work on these lines by Mr. C. E. Green* brings to light a number of remarkable facts. Throughout Scotland he finds the towns with the highest cancer death-rates lie in hollows or on hilly sites, while those with the lowest death-rates occupy flat sites. Of the last, Dumbarton, with 1·80 per cent. of cancer deaths, and Govan, with 2·08, may be cited: of the first, Inverness, Hawick, Galashiels, and Forfar, with mortalities of from 5 to 7 per cent., are examples. The variations in the incidence of the disease are, however, much more local than these facts imply. In the North Riding, for instance, the death-rate is 5·81, but in the 16 registration districts which it includes the figures range from 2·56 in Reeth to 15·01 in Leyburn. The Leyburn area, on account of its excessive mortality, was specially studied. It is agricultural country, and includes three small towns—Leyburn and Middleham, separated by about two miles, and Masham, some five miles off. In the two first, with a combined population of 1495, there were 37 cancer deaths in ten years; in the last, with more than twice as many inhabitants, there were only two. These localities correspond to the rule stated, Masham being flat country, the others hilly. A number of other similar instances are given, and it is suggested that irregular levels due to buildings of unequal size may help to explain differences in cancer distribution in large towns—as, for instance, Marylebone with 17 per cent. of deaths, against Stepney with only 1·84 per cent.

The theory on which Green proposes to account for the effect of the lie of the country on the cancer death-rate is, briefly, that irregularity in the levels of houses, whether natural or artificial, favours incomplete removal of the products of combustion of coal, and he adduces a considerable volume of evidence from other sources in support of the hypothesis. Whatever be the explanation, there is no doubt as to the facts he brings forward, which prove that hitherto unsuspected variations exist in the distribution of cancer in closely adjoining areas—variations which are probably not analogous to those of any other disease. Facts of this order are always valuable, and if future observations confirm and amplify them, they will certainly have to be taken into account in any hypothesis as to the nature of cancer, and may ultimately help to elucidate the cause of the disease. The line of research which Mr. Green has undertaken is most promising, and deserves to be thoroughly followed up.

Appointment.

THE King has been pleased, on the recommendation of the Secretary for Scotland, to approve the appointment of Ashley Watson Mackintosh, Esq., M.A., M.D., to be Regius Professor of Medicine in the University of Aberdeen, in the place of Professor David White Finkay, who has resigned.

* *The Local Incidence of Cancer*, by Chas. E. Green, F.R.S.E., Edinburgh 1912.

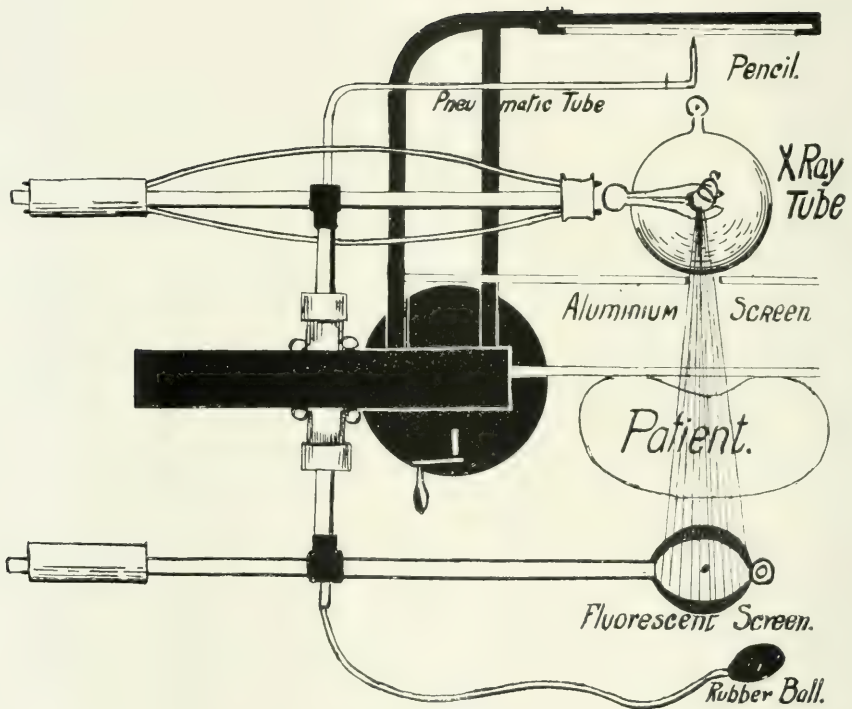


FIG. 1.—DIAGRAM OF GROEDEL'S MODIFICATION OF THE LEVY-DORN
ORTHORADIOGRAPH.

ORTHORADIOGRAPHY OF THE HEART AND AORTA.

By W. HOPE FOWLER, M.B., F.R.C.S.,

Senior Medical Officer in Charge of the Electrical Department,
Royal Infirmary,
and

W. T. RITCHIE, M.D., F.R.C.P.,

Assistant-Physician, Royal Infirmary.

Apparatus and Technique.—The source of energy we employ for the X-ray tubes is a Snook High Tension Transformer. The orthoradiograph is Groedel's modification of the Levy-Dorn apparatus.

The Snook apparatus, invented by Snook of Philadelphia, introduced by Dr. Leonard into this country, and made by Newton of London, enables this work to be carried on with a minimum of difficulty. It consists of three parts:—The main current, a constant one, is converted into an alternating one by means of a motor convertor or inverted rotary. This interrupted current is fed into the primary of a step-up transformer, which is immersed bodily in a galvanised iron tank filled with an insulating oil. The secondary current is conducted to the high tension rectifier, which, being on the same axle as the rotary, permits of our using the current of right polarity to light up the X-ray tube.

It is possible at the same time to make use of the inverse, or current of wrong polarity, but it is better to eliminate that by a simple arrangement of switches. In the secondary circuit there is developed a current of 10,000 to 125,000 volts, at a milliamperage of 1·5 to 30 or 40 m.a., therefore useful for all purposes—radio-scopic, instantaneous or distance radiography. With a current strength of from 2·5 to 5 m.a. we can keep our tubes working for lengthy periods without damage.

The Groedel modification of the Levy-Dorn apparatus, a diagram of which is shown in Fig. 1, consists, firstly, of a heavy upright supporting a quadrilateral framework, in which move the supports bearing the two arms on which are fixed the tube and screen, so balanced that it is a simple matter to move screen and tube in all directions in reference to the patient. The centre of the tube, centre of screen, and pneumatic pen are brought into alignment and firmly fixed. The resultant is a parallel projection of rays, which is carried round the organ under examination, and the outline is made by means of the pen on a sheet of paper fixed to the heavy board at the back of apparatus.

To sum up, by the term orthoradiography is meant the more or less exact measurement of various objects, outlines of which are thrown on to a fluorescent screen by a pencil of X-rays. To obviate the distortion produced by the X-rays, which are propagated from the focal point of the anticathode in straight lines in the form of a divergent cone, it is necessary first of all to eliminate all but the central or ray of normal incidence, and after finding this, it is carried round the outline of the object, in this case the heart and great vessels, and a record is made of the silhouette.

Technique.—If satisfactory observations are to be made, it is necessary that the room in which the examination is conducted should be absolutely dark. Even a small amount of light issuing from any source in front of the observer tends to render his work more difficult and his results less reliable. While each examination is being made, the patient, stripped to the waist, is sitting erect on the orthodiagraph chair, and he faces the fluorescent screen and the observer, so that the sagittal direction of the rays is dorso-ventral. In order to keep the patient's body as far as possible in one fixed position during the whole observation, the clamps at each side of the orthodiagraph chair are firmly applied either to the chest wall or to the upper arms kept in apposition with the latter. The observer, having put on his protective lead-rubber apron and gloves and lead-glass spectacles, sits on a high stool in front of the patient and adjusts the fluorescent screen so that it is as close as possible to the anterior surface of the patient's chest without actually touching it. The lights are then switched off. After absolute darkness has been maintained for about five minutes, in order to render the observer's retina as sensitive as possible, he takes the fluorescent screen in one hand and the bulb of the pneumatic pen in the other; the tube is lighted up, and the observation commences.

At the start the screen is moved rapidly in front of the whole precordial region in order to obtain a general idea of the position, form, and size of the patient's heart. After this preliminary inspection, which need not last more than a few seconds, the patient is directed to hold his breath, and the record is taken. We commence by marking from right to left the upper border of the liver. The fluorescent screen is moved so that its opaque lead central spot coincides in succession with points upon the upper margin of the shadow of the liver, and each of those points is marked upon the surface of the paper by means of the pneumatic

pen. The screen is then carried upwards, its central spot following the right margin of the shadow of the heart and great vessels, then over the apex of the right lung and down its outer margin to the starting-point. The patient is now directed to breathe once or twice, and then to hold his breath again, in the same phase of respiration as that obtaining previously. While he does so the upper limit of the diaphragm on the left side, the outer border and apex of the left lung, and the left margin of the shadow thrown by the great vessels and the heart are marked successively on the paper. We find it most satisfactory to take the record at moments corresponding to full diastole and while the patient is holding his breath at the end of a tranquil inspiration, and subsequently, before switching off, to record the chief points of the cardiac outline during full inspiration and full expiration respectively. If the observer has had some experience in the technique, and if the case presents no special difficulty, such as that occasioned by pulmonary oedema, pleural thickening, or enlarged mediastinal glands, the time required to obtain a simple record of the outline of the heart, lungs, and diaphragm need not exceed thirty seconds. A somewhat longer time is necessarily required if we desire to record the form of the heart during different phases of respiration.

The current having been switched off, the lights are turned on, the percussion outlines of the heart and liver are mapped out upon the patient's chest wall, the fluorescent screen is replaced by the pointer, and by means of the latter, together with the pneumatic pen, the surface outline of the patient's chest, the percussion outlines and important landmarks, such as the episternal notch, the level of the third chondro-sternal articulation, the nipples, the apex-beat, the xiphisternum, the umbilicus, and the lower margins of the ribs anteriorly are marked upon the paper. In many instances it is well to supplement the dorso-ventral examination by screening the patient in various oblique positions, in order to determine more fully the relative size of the different cardiac chambers and to confirm or disprove the presence of an aortic aneurysm.

The Normal Heart.—On dorso-ventral illumination the lateral outlines of the normal heart are clearly and sharply demarcated by contrast with the clear area of the lung on either side. The cardiac outline, although varying somewhat in different patients, according to the sex, age, and weight of the person, the conformation of the chest, and the position of the diaphragm, is of ovoid form, with its long axis directed obliquely downwards from right

to left. On frontal illumination the long axis is directed from above downwards and forwards. On dorso-ventral illumination the long axis tends to be vertical in young persons, whereas it is more horizontal in old age. On the right side the outline presents two curves (Fig. 2). The right lower curve is formed by the right auricle. We regard the right upper curve as being formed by the superior vena cava, and not by the aorta, as stated by Franz M. Groedel.¹ The feeble pulsation or the frequent absence of pulsa-

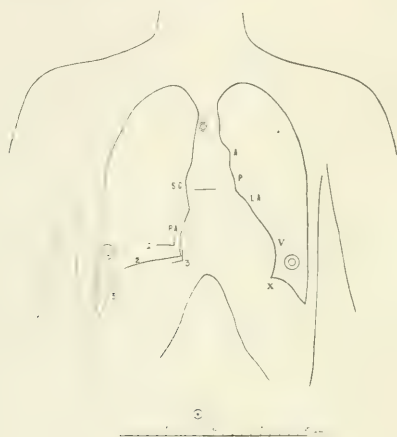


FIG. 2.—NORMAL HEART, FEMALE PATIENT,
AGED 32.

1. In deep expiration. 2. In tranquil inspiration. 3. In deep inspiration.
- A, Curve of aorta. P, Pulmonary curve. L.A., Left auricular curve.
- V, Left ventricular curve. SC, Curve of superior vena cava.
- RA, Curve of right auricle. The position of the episternal notch, level of third chondro-sternal articulation, the nipples and umbilicus shown. X indicates the position of the apex-beat.

tion in the right upper curve in health are presumptive evidence that the normal aorta does not take part in the formation of this curve; and of the correctness of this belief we have satisfied ourselves by inspection of the relations of the superior vena cava and aorta in the cadaver. On the left side there are three, or sometimes four, curves, formed from below upwards by the left ventricle, the left auricular appendix, the conus arteriosus or pulmonary artery, and the arch of the aorta (Fig. 2). In one case of mitral disease with auricular fibrillation the curves which we had marked as left auricular and pulmonary were found at the post-mortem examination to be formed by the left auricular appendix and conus arteriosus respectively. In another

case, one of exophthalmic goitre with marked chronic interstitial myocarditis, the four orthodiagraphic curves on the left side were seen post mortem to be constituted by the left ventricle, the conus arteriosus, the pulmonary artery, and the aorta. In this case the left auricular appendix lay wholly behind the heart.

With the exception of the right upper curve, which is not infrequently somewhat difficult to demarcate precisely, all the curves are clearly defined on the orthodiagraph screen. The left auricular curve in health is often small and inconspicuous. The normal pulmonary curve is larger than the left auricular, but it does not project outwards very prominently. The aortic curve is more marked in adults than in youth, and becomes more pronounced in old age, but the curve of the normal aorta never extends upwards beyond the episternal notch.

Pulsations.—The extent of pulsation of the right auricle, as revealed by the systolic and diastolic excursions of the right lower curve, is slight. In the right upper curve of healthy persons pulsation is either wholly absent or very feeble. There is usually a striking contrast between this phenomenon and the obvious jugular pulsation in the right side of the neck when the patient is recumbent; probably the difference is mainly of postural origin. On the left side the pulsation of the aortic curve is normally greater than that of the pulmonary. The left auricular curve, if present, manifests merely slight pulsatile movement, which it is usually difficult to time definitely as presystolic. The left ventricular curve exhibits the most extensive pulsation. This is particularly evident in the apical portion of the ventricle, where the difference between the margin of the cardiac shadow in systole and in diastole may exceed 1 cm. The apex is the most difficult part of the ventricle to define exactly, for its shadow not merely manifests more ample pulsatile movements, but is also fainter than that of the rest of the ventricle.

Respiratory Movements.—The respiratory movements of the heart are more extensive than the pulsatile. The heart is indeed a freely mobile organ. A consideration of the anatomical relations of the heart, pericardium, and diaphragm indicates that during inspiration the heart becomes longer and narrower, both the apex and the right auriculo-hepatic angle moving downwards and inwards. During expiration, on the contrary, the heart becomes shorter and broader. During tranquil respiration these changes in the form of the heart are more evident at the apex than on the right side, and are of comparatively limited extent. On deep respiration the

change in form is much more obvious, and affects not only the apex and left border, but also the auriculo-hepatic angle and right border of the heart. Fig. 3 illustrates the change of the heart's outline during deep respiration. In this instance the right auriculo-hepatic angle moved 3·2 cm. upwards between full inspiration and full expiration, while the ventriculo-diaphragmatic angle on the left side moved 4·2 cm. upwards and 2·3 cm. outwards, and the main portion of the border of the left ventricle above the apex lay 2·0 cm. further to the left in full expiration than in full

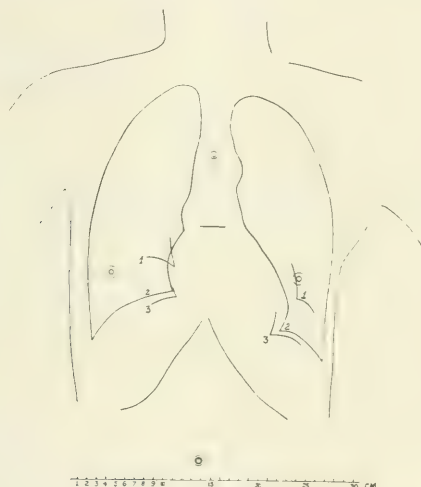


FIG. 3.—MEDICAL STUDENT, AGED 22, TOBACCO ANGINA.

1. In deep expiration. 2. End of tranquil inspiration. 3. Deep inspiration.

inspiration. In another case, a healthy medical man, aged twenty-six, the full respiratory excursion of the right auriculo-hepatic angle was 4·5 cm. and that of the left ventriculo-hepatic angle was 3·8 cm. in the vertical plane, while the respiratory excursion of the left border was 2·5 cm. in the horizontal plane. In other instances the respiratory excursion of the left border did not exceed 1 cm., and in some patients with comparatively limited diaphragmatic movements the respiratory excursion of the left border of the heart did not exceed half a centimetre. As a rule, however, the form of the cardiac outline changes in a striking manner with each deep respiration, and as tranquil respiration is associated with changes of similar nature, although of lesser degree, it is evident that an orthodiagram of a heart loses much of

its value, and may even be misleading, if we do not know in what phase of respiration the record was obtained.

Measurements.—Groedel's¹ methods of measuring the orthodiagraphic silhouette are the simplest and most satisfactory. The long diameter (L.D.) is the distance of the superior cavo-auricular angle from the apex. The maximum distance of the right and left borders respectively (M.R. and M.L.) from the mesial line are also measured, and the sum of these constitutes the transverse diameter (T.D.). The ratio between the size of the heart and the height of the individual is inconstant; that between the size of the heart and the body weight is more constant. Even in health, however, the actual measurements of the heart vary within considerable limits. That the chief factors determining these differences are the sex, age, and weight of the individual is shown by the tables recorded by Groedel,¹ and by Claytor and Merrill.² According to Groedel, the average figures for healthy males are—L.D. 14·0, M.R. 4·6, M.L. 8·4, T.D. 13·0; and for females—L.D. 12·9, M.R. 3·9, M.L. 8·0, T.D. 11·9 cm. Claytor and Merrill give the following as average measurements for healthy males:—L.D. 13·7, M.R. 4·0, M.L. 8·1, T.D. 12·1 cm.; and for females—L.D. 12·5, M.R. 3·4, M.L. 7·8, T.D. 11·1 cm. We have used these figures as rough standards wherewith to compare the measurements of our own series of cases. In some instances we have also employed the method of Levy-Dorn and Möller,³ who take measurements from the patient's right fist as standards for the normal size of his heart. Two measurements are taken—(a) from the ulnar side of the metacarpo-phalangeal joint of the little finger to the dorsal surface of the interphalangeal joint of the thumb, and (b) the sum of the hand's-breadth and the length of the first phalanx of the middle finger. The length of the normal heart, according to Levy-Dorn and Möller, is on an average 1 cm. less than the figure obtained by either of these two measurements.

But even when allowance has been made for sex, age, and weight, the measurements of the healthy heart may differ considerably, and, moreover, the distance of the apex and left border from the mesial plane varies according to the phase of respiration in which the record was obtained, and consequently we do not feel justified in regarding a heart as enlarged merely because it exceeds by a few millimetres the average for sex, age, and weight.

The Form of the Heart in Pathological Conditions.—Morbid

affections of the heart are more readily detected by alteration of form than by variations in size alone. Not only do one or more of the curves forming the cardiac silhouette often present departures from the normal, but each cardiac lesion is as a rule associated with more or less characteristic changes in the outline, some of which we now proceed to consider.

Mitral Incompetence.—In slight cases, with only lesser signs of cardiac enfeeblement and with compensation fairly well established, we find that the cardiac outline does not present any marked abnormality, except perhaps a slight increase in the prominence of the left auricular or pulmonary curves. If compensation is less fully established these curves become more pronounced. In cases presenting signs of obvious cardiac failure we find a more or less general enlargement of the heart's outline, the left ventricular curve being increased and passing upwards into an unduly prominent curve, which it may be impossible to identify as auricular or pulmonary, except by the character and time of its pulsation. The right auricular curve in cases of simple mitral incompetence is not usually markedly excessive. In our cases of pure mitral incompetence the largest heart was that of a man, aged 50, presenting no cyanosis or oedema, in whom the measurements were L.D. 19·7, M.R. 6·7, M.L. 11·6, and T.D. 18·3 cm. When the tricuspid valve becomes incompetent as well as the mitral we find the heart enlarged in all its diameters. Thus in a man aged 34 the measurements were L.D. 18·0, M.R. 5·5, M.L. 12·0, and T.D. 17·5 cm. In these cases the right auricular curve often bulges outwards very considerably; but in many instances the precise outline of the heart is difficult to determine because of pulmonary oedema.

Mitral Stenosis.—The orthodiagraphic picture of mitral stenosis varies not only according to the degree of associated mitral incompetence, but more markedly according as to whether the auricular musculature is contracting in a co-ordinate fashion or is in fibrillation. In mitral stenosis, if the auricles are contracting at their proper time in the cardiac cycle, a presystolic murmur is usually audible, and the pulse is either rhythmic or at least not wholly arrhythmic. In such cases the orthodiagraphic picture often reveals a somewhat vertical heart (Figs. 4, 5), in which the striking feature is the particularly clear demarcation of the curves from one another. At the same time we observe that the right auricular, the left auricular, and the pulmonary curves are enlarged, especially the latter, and that in some instances the

curve of the left ventricle is small (Fig. 4). Orthodiagrams demonstrate more clearly than is possible by percussion that the relative size and distension of the cardiac chambers *intra vitam* are closely comparable to those found at post-mortem examination. We have also been able to gauge the progress of some of our

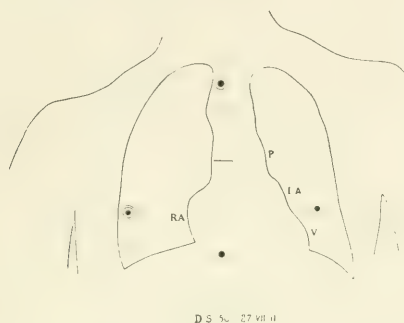


FIG. 4.—MALE, AGED 50, MITRAL STENOSIS,
WITH PHYSIOLOGICAL RHYTHM.

cases, and to determine the efficacy of treatment, by comparing orthodiagrams taken at intervals during the patients' stay in hospital. Unless the changes in form and size of the heart's

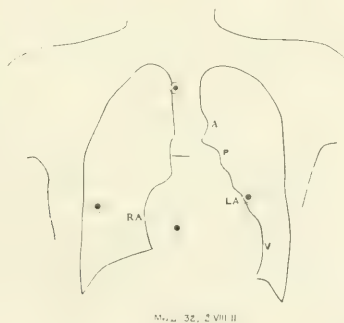


FIG. 5.—FEMALE, AGED 32, MITRAL STENOSIS,
WITH PHYSIOLOGICAL RHYTHM.

The pulmonary curve is particularly prominent.

outline are well marked, however, we must be cautious in drawing hasty conclusions from orthodiagrams, because an apparent diminution in the size of the heart may be due, at least in part, to the record having been obtained in a different phase of respiration than when the earlier record was taken.

Auricular Fibrillation.—Cases of auricular fibrillation, with or without mitral stenosis, present a large globular heart in nearly

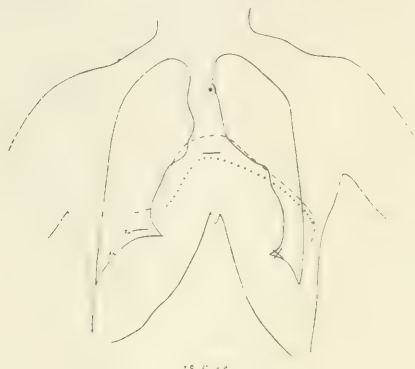


FIG. 6.—FEMALE, AGED 25, MITRAL STENOSIS, WITH AURICULAR FIBRILLATION.

A large globular heart.
 The deep percussion dulness of the heart.
 x x x x x The superficial percussion dulness.

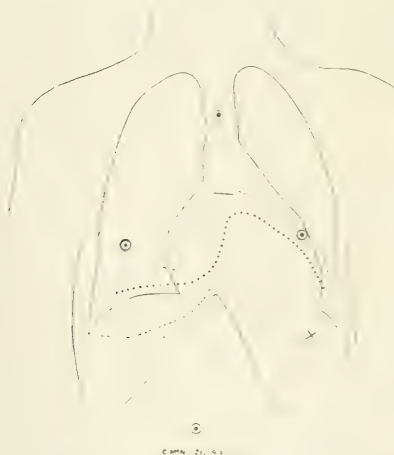


FIG. 7.—MALE, AGED 21, AURICULAR FIBRILLATION.

Record taken during tranquil respiration.
 The deep percussion dulness.
 x x x x x The superficial percussion dulness in full expiration.
 - - - - - The superficial percussion dulness in full inspiration.

every instance of our series (Figs. 6 and 7). In ten consecutive cases the following measurements were recorded:—

Sex	Age	M.R.	M.L.	T.D.	L.D.
Male . .	21	4.5	12.0	16.0	18.0 cm.
„ . .	24	6.2	10.4	16.6	18.5 „
„ . .	27	5.2	9.6	14.8	15.8 „
„ . .	31	5.0	9.0	14.0	15.0 „
„ . .	40	6.7	12.3	19.0	19.5 „
„ . .	45	4.5	10.2	14.7	14.0 „
Female . .	25	6.8	7.3	14.1	14.0 „
„ . .	34	6.7	10.1	16.8	18.9 „
„ . .	40	8.4	8.5	16.9	17.5 „
„ . .	45	4.0	7.9	11.9	13.2 „
Average		5.8	9.7	15.4	16.4 „

The right auricular curve is lengthened and projects prominently to the right. The left margin is displaced outwards. The curves of the left auricle and the pulmonary artery are either markedly prominent, bulging outwards and upwards towards the left axilla, or, if the dilatation of the left auricle and right ventricle be still more excessive, these curves become fused with each other and with that of the left ventricle. In auricular fibrillation the globular form of the heart is most pronounced in those patients who present such signs of cardiac failure as dyspncea and cyanosis, yet the globular heart may be observed in cases with relatively trivial cardiac symptoms. In exceptional instances patients who present auricular fibrillation, but who are able to be up and to go about the ward, do not show the globular form of heart, and in them the pulmonary and right and left auricular curves are only moderately enlarged.

Aortic Incompetence.—In cases of simple aortic incompetence the heart is usually but not constantly enlarged. In some cases we found that the form of the cardiac outline did not differ very materially from the normal; in others the long axis of the heart was even more vertical than normal; but in grave cases the “recumbent egg-form” described by Groedel may be seen. In eight cases the following measurements were recorded:—

Sex	Age	M.R.	M.L.	T.D.	L.D.
Male . .	23	4.7	7.5	12.2	14.4 cm.
„ . .	38	4.8	7.8	12.6	15.7 „
„ . .	38	5.0	8.0	13.0	16.0 „
„ . .	41	5.0	9.2	14.2	14.5 „
„ . .	49	5.1	11.4	16.5	18.9 „
„ . .	51	5.6	12.5	18.1	17.8 „
„ . .	58	5.0	10.3	15.3	16.5 „
„ . .	68	4.1	8.7	12.8	14.0 „
Average		4.9	9.4	14.3	15.9 „

When we compare these measurements with those from cases with auricular fibrillation, it is found that the average measure-

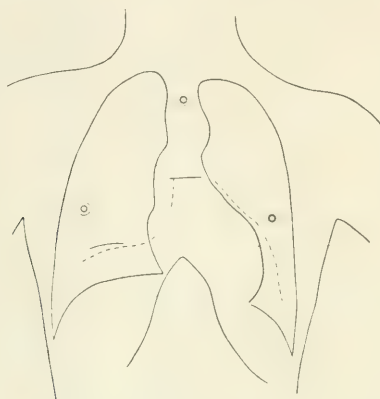


FIG. 8.—MALE, AGED 23, AORTIC INCOMPETENCE.

..... The deep dulness.

ments in uncomplicated aortic incompetence are less than those in auricular fibrillation.

Although the form of the cardiac outline is not uniformly

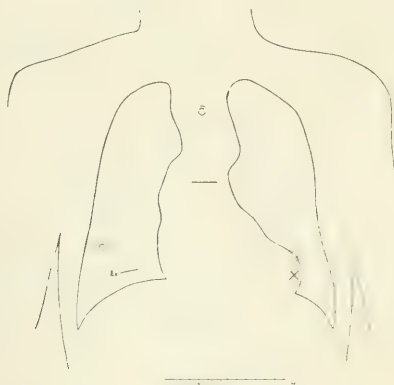


FIG. 9.—MALE, AGED 58, AORTIC INCOMPETENCE.

X, The position of the apex-beat. Ex, Upper margin of shadow of liver in full expiration.

identical in all cases of aortic incompetence, those that are shown in Figs. 8 and 9 are probably the most characteristic. In both these figures the long axis of the heart is more horizontal than in health, and the long diameter is excessive owing to dilatation

and hypertrophy of the left ventricle. The pulmonary and auricular curves are not excessively prominent, indicating that neither the right ventricle nor the auricles are unduly distended. The right upper curve, however, is unduly prominent, and may exhibit excessive pulsatile movement, indicating dilatation of the ascending portion of the aortic arch. The uppermost (aortic) curve on the left side is also excessive and pulsates freely. In other instances, when the dilatation of the aortic arch is associated with dilatation of the thoracic aorta, or with undue distension of the conus arteriosus, the cardiac shadow at the level of the third chondro-sternal articulation becomes more diffusely broadened.



FIG. 10.—MALE, AGED 61, AORTIC AND MITRAL INCOMPETENCE.

X. The position of the apex-beat.
..... The deep percussion dulness.

In cases such as these it is especially desirable to examine the patient in oblique positions, and particularly in that with the patient turned 45° to the right, in order to exclude the presence of an aneurysm of the aorta. In many cases of aortic incompetence the aortic shadow is found to be unduly dense owing to pathological thickening of the wall of the aorta.

Aortic and Mitral Incompetence.—In these cases the curve of the left ventricle becomes further enlarged, while the curves of the right and left auricles and of the pulmonary artery become more prominent than in cases of pure aortic incompetence. In advanced cases the heart's outline becomes still more globular, and all the diameters are increased (Fig. 10). The average

diameters of four cases were M.R. 6.1, M.L. 11.4, T.D. 17.5, and L.D. 18.5.

In many cases presenting cardiac symptoms, but without any recognisable evidence of valvular lesion, an orthodiagram may be of considerable interest and value. In cases of chronic interstitial myocarditis and of arterial sclerosis, for example, the orthodiagram may reveal enlargement of the left ventricle which was not sufficiently pronounced to be recognisable by palpation or percussion. In cases giving a history of palpitation, tachycardia, or angina, the determination that the heart's outline is wholly normal, or that there is obvious enlargement of the ventricular, pulmonary, or auricular curves, is of great assistance in forming a definite opinion as to the cause of the patient's trouble and as to the prognosis of the case. The size, form, and pulsations of the aortic curve should be studied with particular care in cases of angina pectoris in comparatively young persons. In some of these cases the aorta will be found to be perfectly healthy; in others the aorta bulges too prominently either on the right or the left side, and at the same time the aortic shadow may be unusually dense owing to thickening and calcification of the aortic wall, and the pulsations of the aorta may be of excessive amplitude. In patients who are convalescing from pneumonia, and in whom enfeeblement of the right heart may be suspected, the orthodiagraphic record may demonstrate a pronounced bulging of the pulmonary curve in the absence of any abnormality of the auricular curves. In two of our cases convalescing from acute pericarditis the right auriculo-hepatic angle in the orthodiagram was obtuse.

Some of the irregularities of the heart's action can be observed readily on the orthodiagraph screen. Ventricular extrasystoles are best seen at the apex of the left ventricle. As a rule, the auricular pulsations are not sufficiently well seen on the screen to enable one to determine by this means alone whether the auricles are beating rhythmically or not; but in a recent case of complete heart-block we could see very clearly that the right auricle was beating rhythmically about eighty times per minute, whereas the rhythmic pulsations of the left ventricle and the aorta were at the rate of only thirty-three per minute.

In the diagnosis of aortic aneurysm the orthodiagraph enables us to define the exact site and size of the aneurysm in a manner that is seldom possible by means of palpation and percussion (Fig. 12). We have found the orthodiagraph of especial assistance in cases of deep-seated aneurysm of the thoracic aorta (Fig. 11).

During the past year we have compared the percussion outlines of the heart with the orthodiagraphic outline in many of our cases, and we find that percussion has usually failed to afford us accurate indications of the size of the heart. We find that the



FIG. 11.—ANEURYSM OF DESCENDING THORACIC AORTA.

left border of the heart and the upper limit of the liver, as ascertained by a firm percussion stroke, are usually placed too far to the left and too high respectively. The error is often slight and



FIG. 12.—MALE, AGED 68, ANEURYSM OF THORACIC AORTA.

trivial in the case of the normal heart, but when the heart is much enlarged the percussion outline is often quite erroneous. What the late Sir William Gairdner called a carefully minimised percussion stroke is, in our opinion, better than a firm stroke for the

delimitation of an organ such as the heart. But even by means of the most carefully adjusted percussion stroke, the precise form and size of the heart cannot be determined as accurately as by means of the orthodiagraph. We have to remember that the heart lies obliquely in the thorax, the base lying further back than the apex, and consequently the determination, by means of percussion, of the upper or basal part of the heart, including the left auricle and *conus arteriosus*, must necessarily offer special difficulty. Further, we find that the enlarged heart is as a rule more difficult to percuss out accurately than the normal heart; that the right border as ascertained by percussion is more often erroneously demarcated than the left; and that except in cases of pericardial effusion the left percussion border is almost certainly inexact if it lies well outside a clearly defined apex-beat. The latter is often the best guide we have regarding the size and degree of enlargement of the left ventricle.

In conclusion, we desire to express our sincere thanks to the trustees of the Clinical Medicine Research Laboratory of the Royal Infirmary of Edinburgh for much kind advice and assistance in the course of our work in the laboratory, and to our colleague, Mr. Archibald McKendrick, to whom we are indebted for the drawing reproduced in Figure 1.

REFERENCES.—¹ *Die Röntgendiagnostik der Herz- und Gefässkrankheiten*, Berlin, 1912. ² *Amer. Journ. Med. Sci.*, 1909, cxxxviii. 549; 1910, cxl. 506. ³ *Zeitschr. f. klin. Med.*, 1911, lxxii. 563.

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EXNUCLEATION OF THE FAUCIAL TONSIL WITH THE GUILLOTINE.

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The Anatomy of the Tonsil.—The tonsil is a mass of lymphoid tissue situated between the anterior and posterior pillars of the fauces. It is an oval body with an upper or buried pole and a lower projecting pole. It has a free or faucial surface and a lateral or buried surface which is enclosed in a tough fibrous capsule. Its free surface is covered by stratified epithelium, which dips in here and there to form crypts. These are clefts which extend into the tonsil, usually as far as the capsule. One of the crypts at the upper pole of the tonsil is much larger than the others, and has been named the supratonsillar fossa. This name is misleading, as the fossa is entirely enclosed by the tonsil capsule and is thus *intratonsillar* and not supratonsillar. The mucous membrane of the anterior pillar is prolonged for a variable distance over the faucial surface of the tonsil under the name of the *plica triangularis*. The amount of tonsil hidden behind the anterior pillar and enclosed in capsule is very variable. It is frequently found that a tonsil, which at first sight appears to be normal, is really considerably enlarged, the enlargement being confined to the embedded part. This is spoken of as a submerged tonsil. Usually when a patient retches the tonsils are projected into the pharynx, but in the submerged type this does not occur.

Between the capsule of the tonsil and the superior constrictor muscle of the pharynx there is a quantity of loose areolar tissue, which allows of a fair amount of manipulation of the tonsil without fear of injury to the constrictor or the vessels outside it.

The blood-supply to the tonsil is large and is derived from various sources. The tonsillar branches of the lingual, facial, and ascending pharyngeal arteries reach the tonsil by piercing the capsule at its lower pole. The descending palatine artery also sends one or more branches to the tonsil, which pass downwards in the posterior faucial pillar. Another small vessel is often seen just under the plica at its upper end.

The carotid vessels are situated at some distance from the

tonsil (Fig. 1). They lie much farther back and external to it, and under ordinary circumstances are not likely to be injured in operations on the tonsil. The writer has, however, seen an anatomical specimen in which the internal carotid artery formed a complete loop just before entering the base of the skull. The large vessel which lies nearest to the tonsil is the facial artery—a short distance from its origin from the external carotid.

Certain of the bony points in the neighbourhood are of importance in removing the tonsil.

The prominence on the inner side of the lower jaw caused by the socket of the last molar tooth (*eminentia alveolaris* of Sluder) lies a short distance above and in front of the tonsil, and affords a convenient point for counter-pressure in tonsillectomy (Fig. 2). It can be easily felt by passing the finger into the mouth between the tongue and the last molar tooth.

The tuberosity of the superior maxilla and the hamular process of the internal pterygoid plate have an intimate relationship to the tonsil. These points can be easily felt by pressing outwards on the palate just above and behind the last upper molar tooth. The upper or submerged pole of the tonsil lies very constantly just below the hamular process, and after enucleation of the tonsil the latter can be felt lying practically uncovered in the upper part of the cavity.

In 1910 Whillis and Pybus described a method of removing the tonsils with a guillotine, and gave the results of 150 cases, in which 42·3 per cent. of the tonsils were completely enucleated. A further 27 per cent. were removed almost entire but with a small defect in the capsule. In 1911 the same writers published the results of a further series of 100 cases, in which 74 per cent. of the tonsils were removed completely in one piece. In a further 13 per cent. there was a small defect in the capsule.

The general principle of their method was that the tonsil was pulled upwards and forwards by the ring of the guillotine, which caused a bulging of the anterior faucial pillar and palate. The finger was placed on this bulging area and the tonsil pressed through the ring of the guillotine, the blade of which was then pushed home.

Sluder in 1911 described a method in which advantage was taken of the prominence of the socket of the last lower molar tooth. The tonsil was pulled forwards and upwards with the ring of the guillotine and pressed firmly against this bony point, which forced the tonsil through the aperture. The blade was then slid

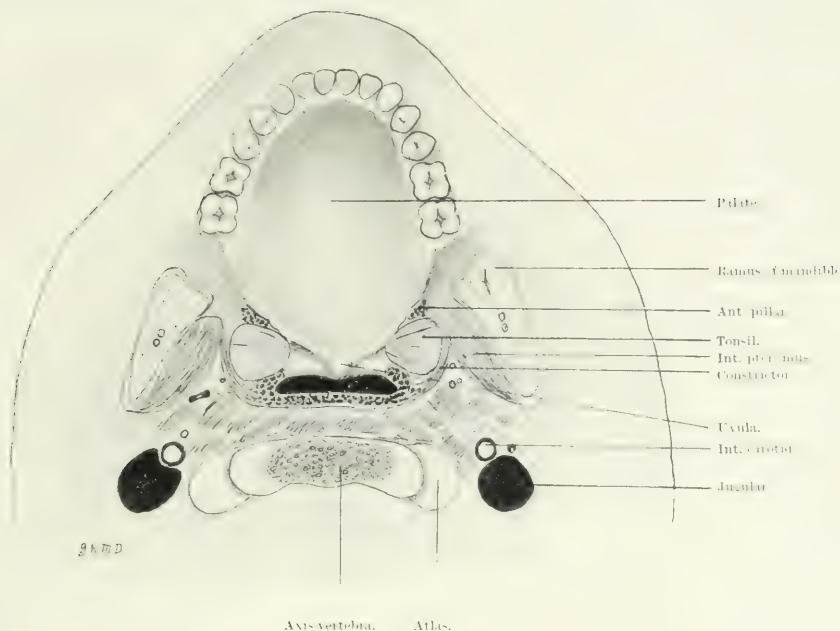


FIG. 1.—SEMIDIAGRAMMATIC DRAWING OF HORIZONTAL SECTION OF HEAD OF CHILD, SEEN FROM BELOW. NOTE THE POSITION OF THE INTERNAL CAROTID ARTERY.

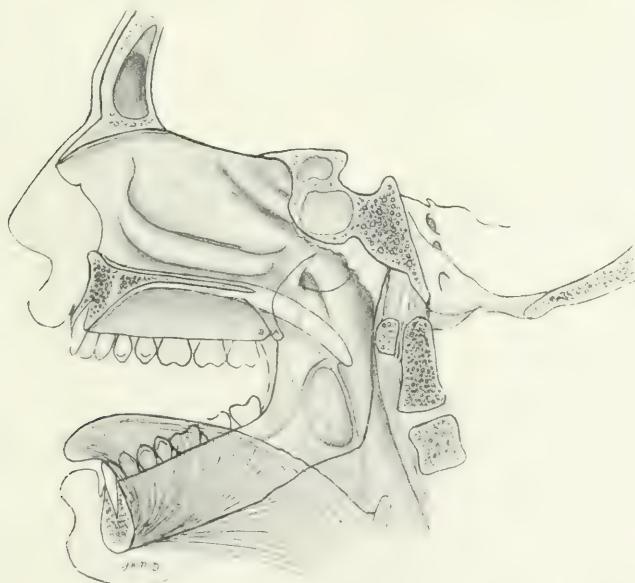


FIG. 2.—DRAWING OF MESIAL SECTION OF HEAD SHOWING THE POSITION OF THE TONSIL WITH RELATION TO THE BONY POINTS. THE POSITION OF THE SUBMERGED PART OF THE TONSIL IS INDICATED BY A DOTTED LINE.

A indicates the hamular process, B the tuberosity of the maxilla.

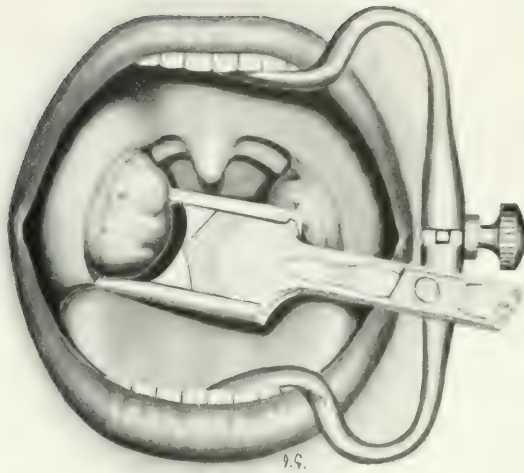


FIG. 3.—NOTE THE POSITION OF THE GUILLOTINE AND THE BULGING OF THE PALATE.

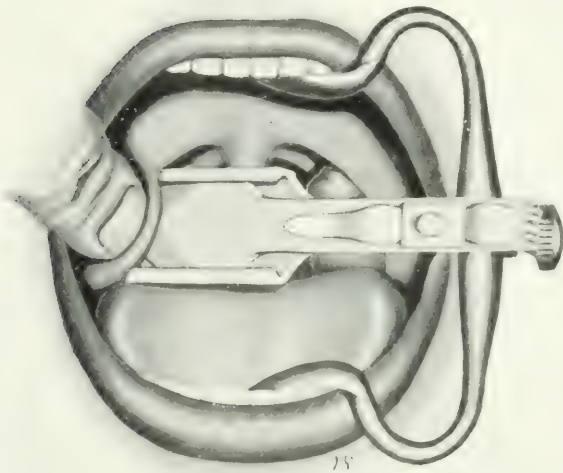


FIG. 4.—THE TONSIL HAS BEEN PUSHED THROUGH THE RING OF THE GUILLOTINE AND THE BLADE IS PARTLY HOME.

home. Occasionally the process had to be helped by the point of the finger.

Technique.—The method I have employed is that of Whillis and Pybus with a slight modification. The instrument used was Whillis and Pybus's modification of the Mackenzie pattern, the essential features of which are as follows:—The shaft of the guillotine is greatly strengthened and the handle is attached to it at an obtuse angle. The ring is small, the diameter being about 1.75 cm. The edge of the blade is blunted and has a blunt point. The only instruments required for the operation are a guillotine and a gag.

A good gag is an absolute essential to the success of the operation. A modified form of the Doyen pattern is the best, as it is practically self-retaining.

I have used ethyl chloride in all my cases and have found the anaesthesia quite long enough to permit of the removal not only of the tonsils but of adenoids as well.

The patient lies on the table turned slightly on his right side, with the head and shoulders supported by pillows. The head is slightly extended.

When the patient is properly under the anaesthetic the gag is opened and the mask removed. It is advisable to attack the lower tonsil first, as it would otherwise be hidden by blood.

The operator introduces the guillotine and depresses the tongue with it. By so doing the lower pole of the tonsil is exposed. The end of the instrument is hooked round the lower pole with the blade side next to the tonsil. The tonsil is now pressed upwards and forwards against the tuberosity of the superior maxilla and the hamular process. By this procedure the tonsil causes the palate to bulge forwards, giving an appearance something like a peritonsillar abscess (Fig. 3).

A finger of the disengaged hand is put on this bulging of the palate and the tonsil pushed firmly through the ring of the guillotine (Fig. 4). As a rule it goes through with a distinct jerk, and with a little experience the operator can tell by the feel of it whether it is properly through or not.

The blade of the guillotine is now pushed home. Considerable force is required for this since the blade is blunt.

With a twisting movement the tonsil is removed from the mouth on the under surface of the instrument. In cases in which the tonsil is large and hard it is sometimes impossible to press it through the ring of the guillotine. In such a case one

can remove it in two or more pieces. The removal of each tonsil occupies only a few seconds, after which adenoids can be removed in the usual way.

On examination of the tonsils after removal it is seen that they are turned quite inside out. The capsule is seen as a small concave area on one side of the tonsil, while on the opposite side the crypts are burst open and at first sight look like cut surface. However, if the tonsil is turned right side out a large convex surface covered by capsule is seen. The free surface of the tonsil is as a rule comparatively small. If a probe is passed into the crypts it does not come out at the other side, whereas if part of the capsule is absent the probe will pass right through the tonsil.

The degree of bluntness of the blade is of some importance, since a too sharp blade will cut right through the tonsil itself. On the other hand, if it is too blunt it will be impossible to drive the blade home.

As already mentioned, it will be found advantageous to begin with the right or lowermost tonsil, since if the upper tonsil is taken first the lower one is rather obscured by blood. The left tonsil is better removed by using the guillotine in the left hand, by which one avoids the necessity of crossing the hands.

The principle upon which the whole success of the operation depends is that the tonsil should be thoroughly pushed through the ring of the guillotine. If the tonsil is not properly through, the blade cuts into it instead of outside it, and great difficulty is experienced in pushing it home on account of its having to cut through the tough fibrous capsule instead of merely loose areolar tissue. When the blade is in the proper layer it goes home much more easily.

In cases in which there have been repeated attacks of tonsillitis the tonsil may be tough and adherent to the surrounding parts, making it rather difficult to push it properly through. However, with care, this can usually be successfully accomplished.

As already mentioned, tonsils which are too large to go through the ring of the guillotine can be removed in two pieces.

A word of warning is necessary with regard to the uvula, which has a peculiar tendency in this operation to get in the way, and unless one is very careful it may be removed instead of or along with the tonsil.

After the guillotine has been used in a large number of cases it may be found that even when the blade is pushed properly home the tonsil is not thoroughly severed from its connections and

cannot be removed without some separation with the finger. This is due to the two edges of the slot of the ring, into which the blade is driven home, becoming gradually separated, so that the tissues are not properly nipped and divided between the blade and the ring. This can be remedied by hammering or squeezing the two parts of the ring together again.

Complications.—Hæmorrhage gives very little trouble in this operation—indeed there is less bleeding at the time of the operation than with a slicing operation. There has been no reactionary nor secondary hæmorrhage in any of my own cases nor in any of the cases operated on by my colleagues.

Rises of temperature on the second or third day following the operation, accompanied by a rather dirty-looking throat, occurred rather frequently at first. As one's technique improved these cases became fewer, as they were probably due to bruising of the tissues.

In one case the operation was followed in a few days by acute suppurative otitis media, but I attribute this rather to the adenoid operation than to the removal of the tonsils.

A temporary paresis of the palate occurred in one of my early cases, and was probably due to faulty technique.

The uvula was removed accidentally in one case.

RESULTS IN 50 CASES. NUMBER OF PATIENTS, 50.

Cases in which both tonsils were completely enucleated	37 = 74 per cent.
Cases in which only one tonsil was attempted and completely enucleated	4 = 8 ..
Cases in which one tonsil was complete and the other incomplete	3 = 6 ..
Cases in which both tonsils were incompletely removed	5 = 10 ..
Cases in which the result was doubtful or had not been noted	1 = 2 ..
Total number of cases in which one or both tonsils were incompletely removed	8 = 16 ..

This series represents my first 50 cases, and from the above it will be seen that the percentage of double complete enucleations was 74. I expect that in my next 50 cases the proportion will be distinctly higher. Those cases in which the tonsils were not completely removed were nearly all at the beginning of the series, before I had thoroughly mastered the technique and learned to overcome the difficulties. Here it was found that in nearly every case the upper or submerged pole had been completely removed but a piece of the lower pole had been left behind. The result even in these cases is distinctly preferable to that after

the older slicing guillotine operation, in which the upper pole is almost invariably left behind.

In 4 cases only one tonsil was attempted and removed successfully. In two of these cases there was no tonsil at all on the other side. In one case the other tonsil was present but not enlarged nor submerged. In the remaining case one tonsil had been removed by another operator some time previously.

In the majority of the cases it was impossible to ascertain the ultimate result, as most of the patients upon whom this method was employed came from a distance, and it was thought better to limit the method to in-patients till one had seen what were the immediate after-effects in a sufficient number of cases. Some of the patients reported some weeks later, and in a large number of those both faucial pillars were distinct and the palate freely mobile. In others there were some adhesions between the pillars, but not sufficient to interfere with the movement of the palate.

General Remarks.—In comparing this method with the older guillotine operations the question naturally arises whether it is desirable to enucleate the tonsil as a routine procedure. In many cases enucleation is the only efficient method of treatment, for example in cases of repeated peritonsillar abscess, where the septic focus is in the deepest part of the tonsil. In other cases, for example in tubercular tonsils, there may be no special tonsillar enlargement, but the glands in the neck are enlarged and hard. In such circumstances I think that it is desirable that the tonsil should be removed entire. In other cases there is simple enlargement without any glandular involvement. Here there are differences of opinion as to whether a slicing operation is sufficient.

I have seen several cases in which the slicing operation with the guillotine had been performed with a very satisfactory result at the time, but the patient had returned some years later complaining of repeated attacks of tonsillitis and peritonsillar abscess. The submerged part of the tonsil had been left behind and the cut surface had cicatrised over so that the mouths of the crypts were partly or completely closed up and the secretion retained. Here the patient's last state was worse than before the operation. In those cases more radical procedures were required, and the remainder of the tonsil was removed by dissection, which, it need hardly be said, is not rendered more easy by the previous operation. Such a result would have been avoided if the tonsils had been enucleated at the beginning, when it might have been much more easily done.

The question has been asked, why remove an organ which has probably some physiological function? Now, in a healthy adult throat there is practically no tonsil, there being only a few lymph nodules between the pillars. In a child a certain amount of tonsil is normally present, and it is sometimes rather difficult to say just whether a tonsil is enlarged or not. However, I think it may be said that a definitely enlarged tonsil is nearly always the result of disease, and fulfils no physiological function but acts as a vulnerable point through which pathogenic organisms may gain an easy entrance. In any case the lingual tonsil contains a fair amount of lymphoid tissue, besides which there are numerous lymphoid nodules scattered over the posterior and lateral pharyngeal walls. These are probably enough to supply the physiological needs of that region.

Again, surgeons using the older guillotine method or the knife and vulsellum usually try to remove as much of the tonsil as they can. If this is so, it is only logical to adopt a method which ensures the complete removal of the tonsil in almost every case. This is possible with Whillis and Pybus's method, and I would therefore advocate its more general adoption.

In adults who have had repeated peritonsillar abscesses I have not used this method, as the tonsils are fixed by adhesions between the capsule and the surrounding parts, and it would probably be very difficult to press them through the ring of the guillotine. In such cases it is preferable to enucleate the tonsils by dissection under local anaesthesia with scissors and snare.

The advantages of the method may be summarised as follows: it is thorough, quick, and causes less discomfort than enucleation by dissection.

In conclusion, I wish to acknowledge my indebtedness to Dr. Logan Turner, through whose kindness I have been enabled to carry out this method of treatment, and to publish the results in this paper.

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MESOTHORIUM, THORIUM X, AND THORIUM EMANATION, AND THEIR THERAPEUTIC USE.

By DAWSON TURNER, M.D., F.R.C.P.,

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THE thorium emanation is given off more or less freely from the compounds of thorium, the best source, according to Professor Soddy, being a preparation of radiothorium in a moist condition.

Radiothorium is derived from thorium through two intermediate products named respectively mesothorium No. 1 and mesothorium No. 2. Mesothorium 1 is produced as a bye-product in the manufacture of gas mantles; it resembles radium in its chemical nature and cannot be separated from it; it disintegrates into mesothorium 2. The latter radiates beta and gamma rays and yields radiothorium; from the latter thorium X is produced, and from thorium X the thorium emanation. The emanation has a life of about 76 seconds; it radiates alpha rays and leaves an active deposit called thorium A; this disintegrates into thorium B, this into thorium C, and this into thorium D.

The important members of this group from the medical point of view are mesothorium, thorium X, and its emanation.

The presence of the emanation can be shown by its ionising effect in discharging an electroscope, by the phosphorescence it imparts to zinc sulphide, and by its behaviour as a gas. The ionising effect can be produced at a considerable distance and in consequence after a certain lapse of time. At a distance of ten feet there is a delay of about half a minute before the leaves begin to fall; when once the fall has begun it continues steadily until the leaves are discharged. Experiments were performed to ascertain whether the presence of an electrified wire gauze screen placed between the source of the emanation and the electroscope would produce any recognisable effect. At first it appeared that when the screen was negatively electrified the rate of discharge was accelerated and *vice versa*, the rate of discharge being 3 seconds when the screen was negatively electrified, 5 seconds when un-electrified, and 10 when positively electrified. On surrounding the electroscope with an earthed conductor this difference disappeared, so that the effects previously observed must have had an electrostatic origin. A powerful magnetic field interposed

between the source of the emanation and the electroscope was also found to produce no recognisable effect.

Another way of detecting the emanation of the presence is to make use of its property of making zinc sulphide phosphoresce. If a little of the emanation be blown upon a plate or through a tube coated with zinc sulphide a very beautiful appearance will be observed—the plate will glow hither and thither wherever the emanation has impinged upon it. A puff of air by blowing the emanation away destroys the glow, which can be re-excited by more of the emanation. Professor Soddy refers in his book on the chemistry of the radio-elements to this experiment, and I had the pleasure of seeing Sir J. Mackenzie Davidson perform it.

There are various methods of preparing the active thorium compounds for therapeutic use.

1. *By Inhalation*.—Air which has been aspirated over radiothorium contains the volatile product of thorium X—the emanation. Patients can be given this air to breathe either pure for short periods or mixed with ordinary air in an inhalation chamber for longer periods. A usual exposure is one of two hours in an atmosphere containing two to four Maché units per litre. In this case the medicament would enter the body by the lungs.

2. *By Ingestion*.—Thorium X can be dissolved in water, or if the emanation were aspirated very slowly through water a considerable fraction of it would be dissolved and the active deposit would be produced *in situ*. The water would contain a solution of the active deposit, and could be administered in appropriate doses.

3. *By Baths Containing a Solution of Thorium X*.—It is found in bath treatment that considerable quantities of the active substance enter the body by inhalation as well as through the skin.

4. *By Local Wet Packs Containing Thorium Salts*.

5. *By Injection of Radioactive Water* either into a tumour mass or into the veins. Czerny and Caan¹ narrate their experiences with mesothorium and thorium X. The latter was dissolved in physiological salt solution and injected either into the growth or into the veins of persons suffering from the growths. Experiments carried out on animals showed that such procedures might easily be dangerous to life if too large doses were administered.

Thirty-six cases of tumours were treated—31 carcinomas and 5 sarcomas. The strength of their solution of thorium X was such that one c.cm. equalled one to three Maché units. The injections into the tumours were well borne. Twenty-four hours later a

local swelling of the tumour occurred with pain and redness. This disappeared at the end of three days and was followed by a diminution in the size, due to the gradual replacement of the cancer cells by dense connective tissue. A hemorrhagic liquefaction sometimes took place. When the intravenous injections were employed unexpected secondary or concomitant effects were sometimes observed, such as nausea, loss of appetite, dizziness and weakness. No important organ suffered disturbance, nor was albumen found in the urine. The same swelling and subsequent shrinking of the tumour generally followed the intravenous injections. This seems to point to an elective action of the thorium X.

The effects produced by thorium X are due partly to the alpha rays it emits and more particularly to the emanation of which it is the parent. The emanation spreading by diffusion conveys the action in every direction, and by disintegration coats the surrounding tissues with the active deposit which radiates alpha, beta, and gamma rays.

Mesothorium No. 1 has been largely used of late on account of its lower cost in place of radium for the treatment of skin affections and growths, and for superficial conditions it is reported to be quite as good as, or even better than, radium. Its action must depend upon its disintegration products—mesothorium No. 2, radiothorium, thorium X, etc.—because it itself is rayless.

The thorium emanation would also probably be found of use in the same class of cases in which the radium emanation has proved of value. The class of cases referred to include gout and rheumatism and other general diseases for which natural mineral waters are prescribed. It has been found that these waters are as a rule radioactive, and that those with the smallest mineral content are the most radioactive. W. His² states that radioactive baths and waters owe their therapeutic value to the emanation of radium. After three years' experience observations have been taken on over 100 cases of gout, and the large majority have been so obviously benefited that the results cannot have been due to chance.

The emanation decomposes uric acid into urea and carbonic acid. (Meseritsky³ showed that the emanation of radium decomposed the monourate of sodium.) Lowenthal⁴ states that the emanation stimulates the body ferments and increases the gaseous exchanges.

The author has only had the opportunity of trying the thorium emanation in one case, a patient of Professor Caird suffering from an advanced excavating rodent ulcer. This case, which was

inoperable, was recommended for radium treatment, but the area to be treated was too vast for the amount of solid radium in the author's possession. Under these circumstances the idea occurred of bringing the thorium emanation to the aid of the radium. The whole cavity was thoroughly sprayed with the thorium emanation some 30 times in the 24 hours, and 15 mgs. of pure radium were applied for 12 hours. Unfortunately the patient did not attend for further treatment and has been lost sight of. The immediate effect of the application of the emanation seemed to be that of reducing the fœtor of the cavity.

REFERENCES.—¹ *Munch. med. Wochenschr.*, No. 14, 1912. ² *Brit. Med. Journ.*, 24th February 1912. ³ *Comptes rend.*, 1912, p. 770. ⁴ *Berl. klin. Wochenschr.*, February 1910.

ROYAL COLLEGE OF PHYSICIANS OF EDINBURGH, ROYAL COLLEGE OF SURGEONS OF EDINBURGH, AND ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW.

THE quarterly examinations of the above Board, held in Edinburgh, were concluded on 23rd July, with the following results:—

First Examination.—The following candidates passed the first examination:—Ethel M. Popplewell, Bolton; A. W. McGregor, Edinburgh; J. F. Kerr, Middlesbrough; F. J. Jack, Colinsburgh; C. V. Samwell, Leeds; S. Swaminathan, Madras; J. A. Tolmie, Inverness; N. J. Laubscher, South Africa; J. S. Durward, Edinburgh; F. B. Macaskie, Bamburgh; L. C. Kotah, India; R. J. T. Malcolm-Gasper, Calcutta; J. V. R. Rohan, Mauritius; and Lizzie O'Flynn, Co. Clare.

Second Examination.—The following candidates passed the second examination:—James Bannerman, Elgin; W. J. F. Craig, Birmingham; D. C. M. Page, Edinburgh; William Walker, Edinburgh; J. W. Gordon, Glasgow; W. D. Bathgate, New Zealand; Alfred Parker, Hillsboro'; Y. N. Kadam, Bombay; S. N. Toulmin, Southsea; Percy Milnes, Brighouse; and F. A. V. Deming, Sligo.

Third Examination.—The following candidates passed the third examination:—W. C. Fraser, Dundee; R. E. Illingworth, Edinburgh; P. L. Manuel, Mauritius; J. M. McLachlan, Edinburgh; W. A. S. George, Bombay; W. S. Rorich, Orange Free State; J. B. Aikin, Belfast; T. B. Truter, Cape Colony; Kenneth Fraser, Scotland; John Ross, Skye; J. M. Beyers, South Africa; and A. O. Olaribigbe, Sierra Leone.

Final Examination.—The following candidates, having passed the final examination, were admitted L.R.C.P.E., L.R.C.S.E., L.R.F.P.&S.G.:—Patrick Mordaunt Carroll, Co. Dublin; Norbert Erno Seppelt, South Australia; Cyril Meredith Willmott, Edinburgh; Thomas Robert Gray Melrose, Edinburgh; Hugh William McHenry Wallace, Belfast; Devendra Bhargdwaja, India; Arthur Barclay Bull, Cape Colony; Alexander Edward Mackenzie, India; Thomas Crawford, Ayrshire; Robert Eyton Jones, Bangor; James Francis Peries, Ceylon; Felix Ethelbert Lowe, Jamaica, W.B.I.; and Gurudas Ram Vohra, Punjab.

TWO CASES OF SEPARATE ACROMION PROCESS, WITH
A NOTE ON THE APPEARANCES PRESENTED IN
RADIOGRAPHS OF THE ACROMION PROCESS
AND UPPER END OF THE HUMERUS DURING
OSSIFICATION.

By J. W. STRUTHERS, F.R.C.S.,
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ALTHOUGH at first sight the ossification of the acromion process would not appear to be of great interest from the clinical point of view, it has nevertheless been the subject of close investigation by surgeons as well as anatomists, and the appearances presented have given rise to considerable discussion. As will be remembered, the base of the acromion process is ossified along with the spine of the scapula at an early age, while the tip remains cartilaginous till between the 14th and 16th years. About that time bone begins to be deposited in the tip of the acromion from a number of separate centres which finally coalesce, and the completely ossified tip, or epi-acromion, remains separated from the base of the process by a cartilaginous epiphysial line until growth is completed, at or before the 25th year.

Controversy has chiefly turned on the point as to whether this epiphysial line ever remains unossified or not.

In the post-mortem and dissecting-rooms, cases are not infrequently found, in adult subjects, in which the epi-acromion is separated from the base of the process along a line which corresponds to the position of the epiphysial line during the period of growth. This line corresponds also to the usual site of fracture of the acromion process, a not uncommon accident.

Some have maintained that the separation is always the result of fracture with non-union, while others believe that it is due to the persistence of the epiphysial line. A strong argument in favour of the latter view, though not a conclusive one, is the fact that the condition is frequently bilateral. In 1895 the late Sir John Struthers published an account of a number of specimens of separate acromion process found in the dissecting-room, and after reviewing all the evidence available at that time, concluded that the condition was probably always traumatic in origin. Cases of bilateral separate acromion process were, he believed, to be explained by the occurrence of injury, not necessarily synchronous, to both shoulders. At the period at which he and others wrote

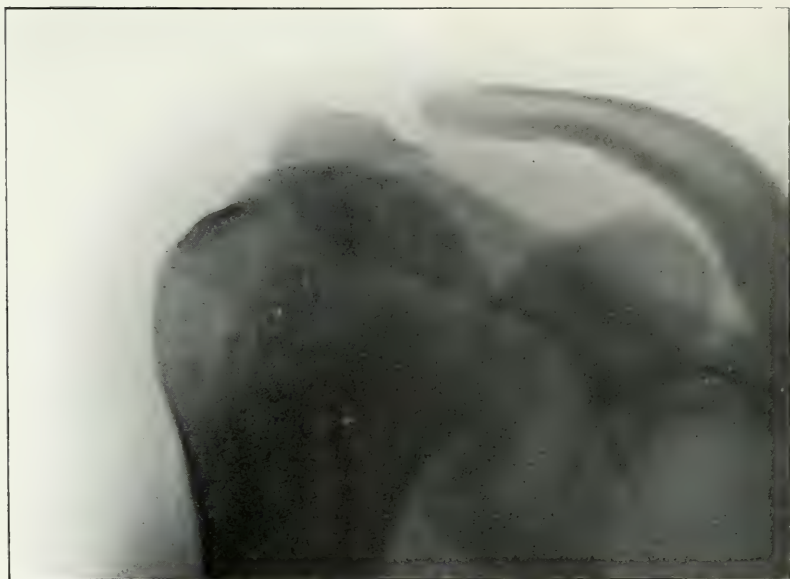


FIG. 1.



FIG. 2.

investigation was necessarily confined to the post-mortem and dissecting-rooms, and the clinical histories of the cases found could not be ascertained to throw light on the matter.

Thanks to the revelations of the X-rays we are now in a position to observe the acromion in the living subject, and I have recently been fortunate enough to obtain radiographs of the shoulder in two cases which show a separate epi-acromion in healthy and uninjured joints.

The first case was that of a miner, aged 40, who was struck by a fall of coal and thrown violently against a beam in such a way that he struck the edge of it with his right shoulder but was otherwise uninjured. He was admitted to the Royal Infirmary some weeks later on account of persisting disability of the shoulder, and was found to have sustained a fracture-dislocation of the humerus. The head of the bone had been broken off at the anatomical neck and was lying in the axilla. The radiograph also showed that the acromion process had apparently been injured, as there appeared to be a crack running across it just behind the facet for the acromio-clavicular joint. A radiograph was then taken of the uninjured left shoulder for comparison, and this showed clearly a persistent epiphysial line in the acromion process (Fig. 1). The patient, fortunately, was able to give a perfectly definite account of his accident and previous history, which left it beyond doubt that he had never sustained any injury to the left shoulder. The line seen in the radiograph of the acromion corresponds exactly with that of the epiphysial line seen before ossification is complete.

The second case was that of a miner, aged 50, who had sustained an injury to the left shoulder and hand, resulting in dislocation of the humerus and wounds of the hand. He was admitted to the Royal Infirmary nine weeks later on account of persistent stiffness of the injured shoulder. A radiograph showed osteoarthritic changes following the injury, along with what appeared to be a separate acromion process. The uninjured shoulder was consequently radiographed for comparison, and showed, as in the first case, a persistent epiphysial line (Fig. 2). The joint was healthy, and had never been injured.

The presence of this condition in two well-developed muscular males, aged respectively 40 and 50 years, who were both able to give a clear history that the shoulder showing the abnormality best had never been injured, is good evidence that the condition, in some cases at any rate, is due to anatomical abnormality and not to injury.

The finding of the condition during life, in patients who could give a clear history, supplies the link in the chain of evidence which was wanting to those whose observations could only be made in the dissecting-room. Separate acromion process is so often found in the course of dissection that, on the assumption that it is always due to injury, some have asserted that although often overlooked clinically, fracture of the acromion is one of the commonest of all fractures. The evidence afforded by the use of the X-rays has not supported this contention. On the other hand, the close correspondence in the position of the usual line of separation with that of the epiphysial line during growth, taken with the fact that this separation is found in adult life, apart from injury, would seem to make it probable that the majority of cases are due to non-union of the epiphysis.

The writer has had a series of radiographs taken in order to show the appearances presented at different ages by the ossifying acromion process. These appearances coincide with the description usually given in the text-books, except that they show ossification to be complete at an earlier age than that usually given, as the two cases above noted are the only examples found showing a persistent epiphysial line after the 20th year. The number of cases examined so far is, however, not sufficient to enable a positive statement to be made as to the average age at which ossification is really complete.

In taking radiographs designed to show the acromion process, the best results are got if the patient is placed in the usual position for a radiograph of the shoulder, *i.e.* on the back, with the shoulder region lying on the plate and the tube in front. The tube should be centred about the junction of the anterior fold of the axilla with the arm. If it is centred higher the rays strike too much in the plane of the acromion process, with the result that its whole extent is not well shown, and the presence of a crack or persistent epiphysial line cannot readily be detected.

Owing to the irregular manner in which bone is deposited from several centres in the epi-acromion, appearances are often presented which closely resemble the results of disease or injury, and great care is necessary in interpreting radiographs taken during the period of growth. Both sides should always be examined before arriving at a conclusion, and care be taken that the limbs to be compared are radiographed in an exactly similar position.

That radiographs of a joint in slightly different positions may

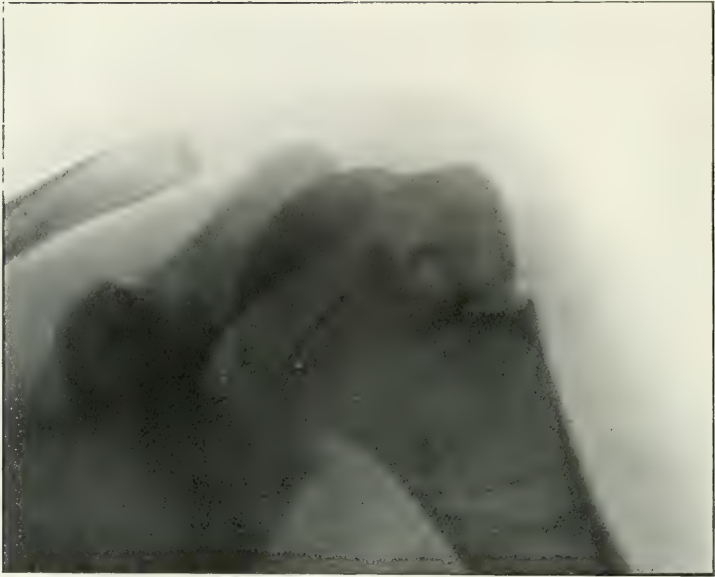


FIG. 3.



FIG. 4.

show strikingly different appearances is well known but sometimes not fully appreciated. This is especially true when epiphysial lines are present to complicate the picture. Figs. 3 and 4, representing the right shoulder of a boy of 13, illustrate this point well. Fig. 3 shows the picture presented when the shoulder was taken from the front, with the humerus placed so that the greater tuberosity looked directly outwards. The conical shape of the upper end of the diaphysis, the contour of the epiphysial line, and the greater tuberosity are well seen. Fig. 4 shows the picture when the humerus was rotated in with the forearm across the chest so that the greater tuberosity looked forwards instead of outwards. The epiphysial line now appears to be doubled, and this appearance is apt to be, and in the writer's experience actually has been, mistaken for the result of injury, one line being regarded as the epiphysial line, the other as a fracture. This double contour is always seen, with a varying distance between the two lines, in any humerus radiographed in internal rotation, before ossification is completed. The radiographs also show the appearance of the acromion before ossification has begun in the epi-acromion.

In conclusion, the writer has to thank Mr. C. W. Cathcart and Mr. J. W. B. Hodsdon for having kindly allowed him to examine and make use of the two cases referred to above as showing separate acromion processes, and Drs. Hope Fowler and McKendrick, of the electrical department in the Infirmary, for their courtesy in allowing him to work in their department, as well as for much assistance in taking and examining a large number of radiographs.

REFERENCE.—Struthers, *Edin. Med. Journ.*, 1895-6, p. 289.

INTUSSUSCEPTION IN CHILDREN—400 DANISH CASES.

By AAGE KOCH

and

H. P. T. OERUM, Copenhagen.

ETIOLOGY AND SYMPTOMATOLOGY.

THE geographical distribution of intussusception shows certain peculiarities, and it is with special reference to this circumstance that we desire to record our investigations on the subject in the English language.

It would appear from formerly reported experiences that England and the English-speaking countries are specially subject to the affection—far more, for instance, than Germany and France. According to our investigations, however, Denmark contributes so much to this casualty that it appears to us that it may be of interest to British readers to compare our Danish results with those obtained in Britain.

We do not propose to dwell at length on the pathological anatomy of the condition, but rather to give a short statistical survey of our material. (Former monographs and treatises are based on the famous collective statistics of Leichtenstern, Wichmann, and Weiss. Hirschsprung and Clubbe have published personal single statistics.)

In the first place we may say a few words on the way in which intussusception arises. In the formation of an invagination we may distinguish two phases—(1) a preliminary circular contraction of the gut; and (2) the overlapping. The first phase is brought about by some abnormal irritation; the second phase was formerly explained as being the consequence of a contraction of the longitudinal muscles, but Propping is surely right when he points out that the commencement of the overlapping is already effected by the circular contraction of the gut, and that this increases in length by depositing itself in the non-contracted part by means of a collar-like turning, which smoothly increases by peristaltic action.

This explanation holds good, not only for the intussusception of the small and large intestine, but also for those of the ileo-caecal forms, where there is a circular contraction of a part of the valv. Baulini or of a part of the caecum.

Our experiments have convinced us that the caecal turning must be the primary event of the formation of the ileo-caecal intussusception; clinically this mode of origin has also been substantiated at operation performed early (Becuel; Maag).

The condition necessary for the occurrence of an ileo-caecal intussusception is that the caecum is "floating"—hence invagination is rare in the presence of a cancer of the caecum, which fixes the gut to its surroundings. The floating caecum is found in 42 per cent. of infants, and only in 17 per cent. of older children (Leriche and Cavillon).

Intussusceptio ileo-colica is to be looked upon as an invagination of the small intestine, which has extended in an aboral direction from an iliac intussusception. A combination of intus-

susceptio ileo-colica and intussusceptio ileo-caecal, as stated by Wilms, must be rejected.

Our statistics embrace 397 cases observed in the period from 1880-1909, including the 107 cases already published by Hirschsprung from the Children's Hospital of Queen Louise.

As to the age and sex distribution we have found the following:—

Sixty per cent. of all the cases occurred in the first year of life: out of those two-thirds occurred in the 5th to the 7th month. During the whole of the 2nd year of life no more cases occurred than in the 5th and 6th months. The frequency of the condition diminished markedly with advancing age. Our youngest patient was 7 days old.

The proportion of boys to girls was as 2·2:1, calculated for all ages under one year. The most common form of intussusception is the ileo-caecal; it was found in about 81 per cent. of children under one year, in children above one year in 66 per cent. of cases.

Predisposing Factors.—As irritants causing the primary gut-contraction, foreign bodies, using the term in its widest sense, are of some consequence. We may mention—(1) *Ascarides*, which are rather common in children above one year. As we have substantiated their presence in 7 of our cases in children of this age, we cannot consider them as an accidental and indifferent factor. The presence of ascarides may give rise to a train of symptoms strikingly like those of intussusception, and we have seen a mistake in diagnosis made, a little patient being submitted to laparotomy under this mistaken supposition.

(2) *Polypi and Meckel's Diverticulum.* — On 8 occasions we have found polypi of the common form (adenoma) as the cause of intussusception. They were generally (6 times) situated in the small intestine; and consistent with this the intussusception most frequently implicated the small intestine, or was a further development in the form of an ileo-colic invagination. We have found a Meckel's diverticulum 9 times; once it was not related to the invagination; once an isolated twisting of the diverticulum was discovered; and in 7 cases the diverticulum was to be looked upon as the cause of intussusception of the small intestine, which had subsequently extended into the colon. The *verruiform appendix* under certain circumstances may act in the same way as a Meckel's diverticulum.

(3) *Laxatives.* — In Denmark ricinus oil, and in Britain

castor oil, possibly play a part in producing intussusception by the strong and irregular peristalsis which they induce. In Denmark mothers often use this drug indiscriminately of their own accord. It can scarcely be a mere chance that Denmark and Britain, the two countries where the greatest use, and perhaps abuse, of laxatives is made, should furnish the largest contribution to the statistics of intussusception.

(4) *The Nutrition*.—As already mentioned, by far the greatest number of cases occur in the first year of life. Hirschsprung many years ago pointed out that breast-fed children are attacked very frequently. Among our patients under 1 year 70 per cent. were suckled. The breast nutrition cannot, however, be the exclusive predisposing cause, for, if so, the great majority of the cases would be heaped up in the first months of life. The maximum number occurs in the 5 to 7 months, which is just the time when the children generally begin to have additional food. At this period also antiperistalsis probably begins to occur in the colon. Before the time that the additional food is given, the fæces of the suckling are thinner; the antiperistalsis is wanting. It is important to remember that, as Nothnagel has shown, a strong antiperistaltic action can cause disinvagination, just as an irregular and inco-ordinated peristaltic action can produce a perhaps passing invagination. The part the antiperistalsis plays must thus be understood, as it predisposes to invagination in sucking children at the time when partial weaning takes place, and the additional food sets up a weak and irregular peristalsis, which, however, may not be strong enough to undo a formed invagination.

(5) *Indigestion*.—From what precedes it will be seen that indigestion can easily play a part in causing invagination. Diarrhœa or constipation is recorded in scarcely half of our histories of intussusception; at the age of one year disorders of the intestine in general, and diarrhœa in particular, seem to be of importance.

The predisposition of boys rather than of girls possibly depends on irritation from the genitalia (cryptorchismus, phimosis, inguinal hernia, etc.). By experiments we have proved that by means of irritation or slight contusion of the funicle, contractions in the cæcal region can be produced.

As to the *symptomatology*, by far the greatest number of cases run an acute or subacute course. We may refer to some of the symptoms.

(1) *Pain*, in its typical form of colic, is as a rule the initial

symptom, but it is difficult to estimate in young children. The absence of pain is noted in only a very few cases. Its presence is positively indicated in 76 per cent. of the cases under one year, and 85 per cent. above one year.

(2) *Vomiting* is an exceedingly frequent symptom, and generally appears soon. We have found it in 92 per cent. of children under one year, in 91 per cent. over one year. In 5 cases the vomit was feculent; twice it was bloody.

(3) *Blood-Stained Mucus per Rectum*.—Many authors attach greater importance to this symptom than to any other. We have found it with great regularity in children under one year (95 per cent.), somewhat less frequently in older children (75 per cent.). As a rule the first evacuation after the onset of the illness is natural, and the time at which bloody mucus appears varies. According to our experience it generally appears very early, in half of the cases within 6 hours. In our opinion it is in intussusceptions of the small intestine that this symptom is most frequently wanting, or delayed in its appearance.

(4) *A tumour or swelling* is the fourth cardinal symptom. It occurs in 85 per cent. of children under one year, in 86 per cent. over one year. It is most frequently found in ileo-caecal intussusceptions, and the swelling is generally found in the upper left quadrant of the abdomen, which is due to the "wandering" of the tumour as it increases. This "wandering" can take place most easily in children, and the longer the duration of the case the more does the tumour lie towards the left side in the line of the colon. In children under one year the tumour could be felt per rectum in 40 per cent., and in older children only in 27 per cent. We would emphasise the importance of examining for the swelling under anaesthesia, otherwise this valuable finding is very apt to be overlooked. Meteorism we have only found in the later stages of the illness, in contrast to Wilms, and we consider it a very unfavourable omen. In little children rise of temperature is rare during the first few days.

As a part of our material is founded on Hirschsprung's 107 cases, formerly published (*Mitt. aus den Grenzgebieten d. Med. u. Chir.*, Bd. xiii.), and the correctness of the diagnosis having been called in question by German writers, we have again critically gone through the 100 records which still are left from the time of Hirschsprung. We have thereby found Hirschsprung's opinion entirely confirmed. Among these 100 a tumour was observed 93 times, and in the remaining 7 cases the diagnosis had been

verified 6 times by operation or section. Bloody mucus was found 96 times; of the 4 times in which this symptom was negative the presence of invagination was established 3 times by operation or section, and in the fourth case relapse took place later on. On the whole, therefore, the clinical signs, as well as the evidence afforded by autopsy, have proved to us that Hirschsprung's diagnosis can fully stand the test.

TREATMENT.

In the ordinary clinical forms of intussusception active treatment is generally urgent, and a natural recovery can only very seldom take place.

Natural recovery may take place either by spontaneous reduction, as is seen in the frequently occurring physiological invaginations, or it may be effected by a casting off of the intussusception produced by sloughing at the neck of the intussusception. Both methods offer so few chances to the patient that their help in the therapy cannot be relied upon.

In the active treatment the operative and the bloodless methods have always to be considered. As the operative method involves a laparotomy, it has naturally only come to take a prominent place within the later decennaries. At present it is interesting to note how the tendency towards operative treatment spreads, in many places to such an extent that the bloodless methods are absolutely neglected and even entirely condemned.

Being sensible of the danger of an indiscriminate use of operative measures, we think it necessary "to try to divide the sun and the wind alike" between the two leading principles—the operative and the bloodless methods—and particularly to do our best to get the operative method reserved to cases in which certain definite indications are found, depending upon the age of the child, the duration of the condition, and the form of invagination present, considerations which we propose to set out further on the basis of our material. This includes about 400 cases we have gathered from Denmark, which, owing to the frequency of the condition there, is a country that affords an opportunity of understanding and appreciating the effects of treatment.

Let us begin with the bloodless methods of treatment, which consist of taxis and the introduction of fluid into the lower bowel. That these have fallen so greatly into discredit is certainly due to the fact that they have not been employed sufficiently actively, which is a condition *sine qua non* of a good result. Hirschsprung,

who raised a discussion concerning invaginations some years ago, has with us founded a school which makes use of a proceeding employed by him on account of its excellence, and which we may describe briefly. Firstly, the bloodless method ought always to be employed in deep narcosis, for which we prefer chloroform. The bladder and the rectum are to be evacuated. Taxis is then executed regularly in such a way that the tumour formed by the invagination is fixed with both hands through the abdominal wall. The direction of the intussusception is ascertained, that is to say, we determine its oral and aboral end, which is rather difficult in invaginations of the large intestine and in the ileo-caecal invagination. Then the tumour is treated systematically by the Hirschsprung disinvagination method, by which an attempt is made to obtain reduction by making pressure against the apex. Hereby a certain amount of the oedema is certainly removed, and disinvagination is rendered possible, either by taxis alone, or by introducing water into the lower bowel later. It is generally by the latter means that the reduction is completed, as can sometimes be substantiated by the passage becoming free and the contents of the intestine escaping.

When, as sometimes has been seen, an intussusception can first be raised from the rectum up against the promontory of the sacrum, then grasped, and by taxis be displaced without force successfully through the whole course of the descending transverse and ascending colon, and at last disappear by the caecal opening, we feel convinced that taxis may prove an excellent method of treatment.

Like taxis, the introduction of water involves a certain definite technique. The fluid is introduced either by irrigation or by means of an enema syringe. An Oser nozzle is introduced into the rectum during narcosis, and is pushed up as far as possible without force, while the child is lying with the pelvis raised. Often it can be recognised through the abdominal wall how the nozzle winds through the long sigmoid flexure. The nates are steadily pressed together around the nozzle, and the pumping with the enema syringe begins, the force employed being adapted and judged of partly by the counter-pressure, and partly by laying the other hand over the abdomen, by which means the radiation on a certain spot is very easily felt. Five hundred to 1000 c.cm. are injected. The water is kept in as long as possible, and is then slowly evacuated by simultaneously making pressure on the abdomen and slowly drawing out the nozzle. The quantity of water which escapes is measured—an abundant quantity bodes

well for reposition—and the water is examined to see if it is mixed with fæces.

If, after this, the tumour has disappeared completely, and if in addition distinct purgation takes place, there is every reason to think that the reposition has succeeded. If not, the treatment is repeated, once at least if the circumstances permit. Hirschsprung, for example, does not hesitate, if there is the slightest doubt as to reposition having been effected, to repeat the injection under another narcosis at intervals of hours or even days, and has many times in frequently relapsing cases obtained favourable results in this way.

If the disinvagination does not succeed fully, there is, at least in most cases, a distinct diminution in the tumour, which is not without importance in the event of a subsequent operation, and any possible injurious effect which the experiment may have had is doubtless soon overcome.

The advantages and disadvantages of the bloodless method may now be briefly stated. The greatest advantage of a successful taxis or injection is that the patient is spared a laparotomy, which is of great moment, for it cannot be denied that this procedure, involving, as it often must do, a more or less extensive evisceration, implies a great danger—a danger which is greater the smaller the child is. Another advantage is that the non-operative measures can be easily employed in general practice, can be executed off hand, and necessitate no hospital. In the hands of the country doctor, if he carefully selects his cases, it affords excellent results.

The dangers of the bloodless methods arise from the fact that they are undertaken without control of the age, and the bugbears will therefore always be the possibility of incomplete disinvagination and of perforation.

The uncertainty of the disinvagination lies in two directions. The little remainder which is often felt after the bloodless attempts may be the thickened sheath of the intussusception. The incomplete disinvagination may either be a pseudo-reduction, in which the intussusception has not been influenced by the treatment at all, but the tumour merely displaced to a region where it escapes palpation (behind the liver, below the splenic flexure, and the like); or it may be partly reduced, the last portion remaining as a swelling, which the investigator comforts himself by believing to be the thickened sheath of the disinvaginated gut—a dangerous hope.

The frequency of failure to disinvaginate cannot and must not be concealed. It was met with 15 times among our 400 patients. In 5 of these 15 cases the incomplete disinvagination was discovered and the patients were submitted to operation. The remaining 10 were not recognised as incomplete. When we mention that 14 out of these 15 patients died, it will be seen that failure to recognise that the disinvagination is incomplete is a very serious matter and is an argument against the bloodless method of treatment.

In comparison with incomplete disinvagination, perforation seems to be an inconsiderable danger. We have only found it in 2 of our cases. A less considerable danger is relapse, and these are submitted to treatment. It seems certain that the tendency to relapse is more frequent after the bloodless methods of treatment. To sum up, the *advantages* of the bloodless method are—(1) availability in general practice; (2) relative safety in tender childhood. The *dangers* are—(1) incomplete disinvagination; (2) perforation; and (3) tendency to relapse.

We need not say much here regarding the technique of the operative methods. The radical operation consists in disinvagination and resection either by the circular or the Barker plan: enterostomy, entero-anastomosis, and such operations, are only palliative. The advantages of the cutting operations are obvious enough, as this method of treatment allows of exact control of the encroachment, which can be done as radically as is wished. The dangers, however, are as certain as the advantages. Although it is contradicted from many sides that it is risky to perform laparotomy on a little child, we shall constantly maintain that it is so, and it is the consideration of the seriousness of this danger, based on our observations, which leads us to concede only a limited field of usefulness to the operation in young infants.

We shall here exclusively follow our own tables, and shall throughout make a distinction between children under and over one year, which, as will be seen, seems to us to be important.

TABLE I.—CHILDREN UNDER 1 YEAR.

	Patients.	Cured.	Died.	
	228	48 per cent.	52 per cent.	
Bloodless Treatment	135	65 ..	35	
Operative Treatment	83	26 ..	74 „	(Primary laparotomy, 31 =71 per cent. Secondary laparotomy, 52 =75 per cent.)

	Bloodless.	Operative.	Not Treated.
Living	87	22	1
Dead	48	61	9
Total	<u>135</u>	<u>83</u>	<u>10</u>
	= Mortality, 35 per cent.	= Mortality, 74 per cent.	

While the result in the non-operated series here tells its own tale and is overwhelmingly favourable, it is necessary to describe the operative measures a little further in order not to judge them incorrectly.

First as to the method employed:—

TABLE II.—83 CASES.

	Disinvagination.	Resection.	Other Methods.
Living	22	0	0
Dead	48	8	5
Total	<u>70</u>	<u>8</u>	<u>5</u>
	= Mortality, 68 per cent.	= Mortality, 100 per cent.	= Mortality, 100 per cent.

As the above table includes both those cases operated on primarily and those done secondarily, *i.e.* after non-operative measures had been tried and failed, it is only just to the operative method to separate these two categories from one another.

TABLE III.—PRIMARY OPERATIONS—31 CASES.

	Disinvagination.	Resection.	Other Methods.
Living	9	0	0
Dead	17	3	2 (Enterostomy)
Total	<u>26</u>	<u>3</u>	<u>2</u>

Of the 31 cases operated on primarily 22 died (= 71 per cent.), a number which appears very disadvantageous in comparison with the 35 per cent. following the bloodless methods of treatment. When, however, we establish corresponding conditions for the mutual appreciation of the two groups, it must be remembered that the 22 fatal cases primarily operated upon (including the 3 resections and 2 enterostomies) would inevitably have died under the bloodless treatment, so that the mortality of the series operated upon is reduced to 65 per cent.

The bad results in the cases primarily operated upon are not due to the fact that they were sent for operation especially late: to refute such an objection we submit the following table:—

TABLE IV.—OPERATIVE TREATMENT.

	Hours.				Days.					
	0-6.	6-12.	12-24.	24-48.	2-3.	3-4.	4-5.	5-6.	6-7.	1..
Living	1	1	4	2	1	0	0	0	0	0
Dead	0	1	5	8	4	1	2	0	0	1

which shows that no fewer than 22 of the 31 patients were submitted to operation within 2 days. By perusal of the records further it appears that these patients were not especially bad subjects for operation.

It seems to us to be of the greatest importance to note that the table shows how greatly the risk of operation increases as soon as the duration of the disease has exceeded 12 hours, and how within 1 to 2 days there is already a mortality of 80 per cent.

While we are ready to admit that primary operation within the first 12 hours is superior to the bloodless treatment in security and does not offer greater dangers, we must consider a later period dangerous for operation. This will be further evident from the results of the bloodless treatment, as shown in Table V., constructed on the same principle as the preceding one.

TABLE V.—BLOODLESS TREATMENT.

	Hours.				Days.					
	0-6.	6-12.	12-24.	24-48.	2-3.	3-4.	4-5.	5-6.	6-7.	8-9.
Living	14	9	22	24	12	2	1	2	1	1
Dead	2	1	7	17	7	4	5	1	1	2

Without any percentage calculation this table shows that the bloodless treatment within the first twelve also gives excellent results, and that in addition that within the period from 12 hours to 3 days this treatment shows a number of recoveries which is overwhelming when compared with the results obtained by means of primary operation.

If we now turn to the other group, the secondary operations, the matter presents itself thus:—

TABLE VI.—SECONDARY OPERATIONS—52 CASES.

	Disinvagination.	Resection.	Other Methods.
Living	13	0	0
Dead	31	5	3
Total	44	5	3

The death-rate is hereby 75 per cent. That in these cases, as distinguished from the primary operations, the conditions were

more serious, there is no doubt, but that the bad results were due to the fact that these cases had been "ill-treated by bloodless reposition manœuvres," we have found no evidence from a study of the records. Nor were the cases allowed to run too long before being operated upon, as appears from the following table:—

TABLE VII.

	Hours.				Days.				
	0-6.	6-12.	12-24.	24-48.	2-3.	3-4.	4-5.	5-6.	6-7.
Living	0	5	5	2	0	1	0	0	0
Dead	0	1	6	14	11	3	1	2	0

This table shows, as does also the preceding one, that the time after 12 hours is very unfavourable for operation. The secondary operation, however, can claim that it saves 25 per cent. who could not be cured by the bloodless method.

Résumé.—In all cases in children under 1 year in which invagination of the small intestine is not evident, or in which there is no evidence of special complications, the bloodless treatment should be tried, as we can thereby reckon on saving two-thirds of the patients. We make no restriction in this indication as regards the duration of the case, unless signs of peritonitis are at hand, as even cases of longer standing yield better results by the bloodless than by the operative method. In specially doubtful cases, primary operation is allowable within the first 12 hours, but they will not prove more satisfactory than the bloodless treatment. After the 12th hour an operation is extremely risky. Secondary operations ought not to be neglected when the bloodless treatment fails, as we may thereby save one-fourth of the otherwise desperate cases.

Our second large group, including children above 1 year, may be tabulated thus:—

TABLE VIII.—PATIENTS ABOVE 1 YEAR.

	Patients.	Cured.		Died.			
		152	73 per cent.	27	per cent.		
Bloodless Treatment	74	88	„	12	„	{	Primary 35 per cent. Secondary 40 „
Operative Treatment	74	62	„	38	„		

TABLE IX.

	Bloodless Treatment.		Operative Treatment.		No Treatment.
Living	.	65	.	46	0
Dead	.	9	.	28	4
Total	.	<u>74</u>	.	<u>74</u>	<u>4</u>
		— Mortality,		— Mortality,	
		12 per cent.		38 per cent.	

If we follow the same method as we used with regard to children under 1 year, we shall arrange the separate operations thus:—

TABLE X.

	Disinvagination.	Resection.	Other Methods.
Living	40	4	2
Dead	14	12	2
Total	<u>54</u>	<u>16</u>	<u>4</u>
	= Mortality, 26 per cent.	= Mortality, 75 per cent.	

When the primary operations are separated from the secondary the result is—

TABLE XI.—PRIMARY OPERATIONS—34 CASES.

	Disinvagination.	Resection.	Other Methods— Enterostomy.
Living	17	4	1
Dead	4	7	1
Total	<u>21</u>	<u>11</u>	<u>2</u>

The mortality of primary operations at this age has fallen to 35 per cent., as against 71 per cent. in infants below one year, but still the operative method does not reach the result obtained by the bloodless treatment, with 12 per cent. mortality. When, however, from the operation statistics, the 7 who died after resection and the 1 after enterostomy are deducted, as these were hopeless by the bloodless treatment, the comparison is that the bloodless method shows a mortality of 12 per cent., and the operative 15 per cent., that is, practically speaking, identical.

For the appreciation of the results of the two methods, it is necessary to show the quality of the material, particularly with reference to the duration of the disease. This appears from Table XII.

TABLE XII.—PRIMARY OPERATIONS—34 CASES.

	Hours.				Days.					Weeks.	
	0-12.	12-24.	24-48.	2-3.	3-4.	4-5.	5-6.	6-7.	1	2	
Living	2	3	0	6	1	1	1	1	5	1	0
Dead	0	0	1	1	2	2	1	2	1	0	0

BLOODLESS TREATMENT—74 CASES.

Living	4	9	17	16	6	3	1	0	1	5	1	2
Dead	0	0	1	0	3	1	0	0	0	3	0	1

After this it will be supposed that the fortunate final result of the bloodless treatment can partly be explained by the fact that these patients were submitted to treatment more speedily than the cases operated upon. From the above table, however, it will be evident that the bloodless treatment *at all periods* affords exceedingly good chances, especially in the first two days. The primary operation also gives good results in the first two days, but after this the risk becomes greater.

We have arranged our cases of secondary operation in older children thus:—

TABLE XIII.—SECONDARY OPERATION—40 CASES.

	Disinvagination.	Resection.	Other Methods.
Living	23	0	1
Dead	10	5	1
Total	<u>33</u>	<u>5</u>	<u>2</u>

As usual, children above one year bear operation better than infants. Thus secondary laparotomy has here also only a mortality of 40 per cent. as against 75 per cent. in children under one year. Secondary operation forces itself upon us as an absolute obligation, as hereby more than half the children can be saved who otherwise, after vain attempts by bloodless methods, would have to be considered as lost. About this point all must agree. Of course, death after unsuccessful attempts at disinvagination by bloodless methods must not be counted against these methods entirely if a secondary operation is deliberately withheld from them. The risk of death is a consequence of their being considered as successfully disinvaginated, while they really are not so, and this is either not recognised or is recognised too late. The advantage of the primary operation is directly evident from what has been said above. For the sake of completeness we may tabulate the time of operation in secondary cases.

TABLE XIV.

	Hours.				Days.				Weeks.		
	0-6.	6-12.	12-24.	24-48.	2-3.	3-4.	4-5.	5-6.	6-7.	1	2
Living	3	5	3	7	1	2	1	0	0	0	0
Dead	0	0	4	5	2	0	1	1	0	0	2

As in the case of primary operations, the limit of success is the 2nd day. In the first 12 hours the chance is evidently especially favourable.

As a résumé of the treatment of children from 1 to 15 years, we may say that as the primary operation yields just as good

results as the bloodless treatment, it must in general be preferred, as it at the same time affords certain evidence that the treatment has been successful in reducing the invagination. The earlier the primary operation can be performed the better; after the second day it is allowable, perhaps even advisable, first to try injections and taxis, and, if necessary, proceed to perform secondary laparotomy. This will give successful results in more than half the children who have been abandoned by the bloodless treatment.

THE INSURANCE ACT.

THE LEGAL POSITION AS TO MEDICAL BENEFIT.

By A. S. PRINGLE, Advocate.

IN framing his insurance scheme Mr. Lloyd George's root mistake was his failure to take the medical profession along with him, and now apparently he has so far lost his temper that he is going to give it up as a bad job, and substitute for medical benefit a cash payment of 6s. or an increase in sickness benefit. He denies that the Government have ever contracted to find medical attendance for insured persons, and Mr. Masterman has repeatedly stated the same thing in the House of Commons. It is therefore interesting to look at the section of the Act on which they base their attitude. The proviso to section 15 says:—

“Provided that, **if the Insurance Commissioners are satisfied** after inquiry that the practitioners included in any list are not such as to secure an adequate medical service in any area, *they may dispense with the necessity of the adoption of such system as aforesaid as respects that area, and authorise the Committee to make such other arrangements as the Commissioners may approve; or the Commissioners may themselves make such arrangements as they think fit, or may suspend the right to medical benefit in respect of any insured persons in the area for such period as they think fit, and pay to each such person a sum equal to the estimated cost of his medical benefit during that period; and where the Commissioners take any such action themselves, they shall retain and apply for the purpose such part of the sums payable to the Insurance Committee in respect of medical benefit as may be required.*”

If we assume, as Mr. Lloyd George now seems to do, that medical benefit in the ordinary sense is not going to come into operation, what will be the rights of the insured persons?

Section 15 never contemplated the total abolition of medical benefit, but only its abolition in respect of certain individuals for definite periods. It will be for a court of law to decide whether the words "make such other arrangements as the Commissioners may approve" can possibly include abolition of medical benefit. One would naturally suppose that that means "make such other arrangements than the panels of practitioners in order to supply medical benefit, not to abolish it." If the Insurance Committee cannot make any arrangements for giving medical attendance, then the Insurance Commissioners must take the matter in hand themselves, and if they fail they *may* pay a cash equivalent to the insured persons.

Mr. Masterman and Mr. Lloyd George assume that 6s. per annum is a cash equivalent, but the Act does not say so. The Act says:—"The estimated cost of his medical benefit during that period." It does not say estimated by whom, but as medical benefit is to be administered by the Insurance Committee, one would naturally suppose that it was the cost estimated by the Insurance Committee. It is also to be observed that it is the estimated cost of supplying medical benefit to a certain individual, and therefore his whole circumstances must be taken into account. For instance, it would be a farce to give 6s. per annum to a shepherd living five miles from the nearest doctor, and to say that that is equivalent to "the estimated cost of supplying him with medical benefit."

When the Act gets into full operation and insured persons are entitled to demand the benefits, this question will require to be decided in a court of law. One method of testing it would be for an insured person who takes ill and whom the Insurance Committee do not supply with a doctor to call in an ordinary practitioner and ask that practitioner to render his account for attendance on the ordinary scale which he would charge to a person in that rank of life; for, as Mr. Lloyd George himself points out, the practice with medical practitioners, even of the higher class, is to vary their fees according to the financial status of their patients from 2s. 6d. up to even £1, 1s. per visit. In an ordinary case a court of law would recognise this principle, and give to the doctor what the Court considers a reasonable fee in all the circumstances. In country districts, of course, no doctor

could attend a patient who lives at a distance of miles from his house for even 2s. 6d., and a common fee is 5s. to 7s. 6d., varying according to distance. The insured person will then sue the Insurance Commissioners for his doctor's account, basing his claim upon the proviso to section 15.

It is to be observed that in the proviso the Insurance Committee have no authority to suspend medical benefit. The Insurance Commissioners must do so, and it is put upon the Insurance Commissioners to pay to the insured person the cash equivalent, and therefore the action would lie, not against the Insurance Committee, but against the Insurance Commissioners.

The action might conclude alternatively for a sum for which, in the circumstances, a doctor might be expected, or could be got, to take on such a patient as an annual payment. This amount would be arrived at by proving in the ordinary way what would be an average number of attendances and multiplying by a reasonable fee per visit.

Another and perhaps simpler method of testing the question will be for an insured person, immediately after 15th January, to raise an action against the Insurance Commissioners for a sum of money equivalent to that for which medical benefit could be obtained on the club-rate principle by a man in his circumstances. The action would be based upon the proviso to section 15, and the evidence by which it would be supported would be the evidence of doctors stating the figure at which they would be prepared to act, and of other doctors saying that that is a reasonable rate. The action could only be met by the Insurance Commissioners proving that the amount was excessive, and that by putting doctors in the witness-box to say that they would be willing to do the work at a lower rate.

The question will then arise whether the Act has taken the matter out of the jurisdiction of the law courts. The Act provides in section 67 for the decision of disputes between an insured person and his society or the Insurance Committee by the Insurance Commissioners, and the decision of the Insurance Commissioners is to be final and conclusive, but this has no application to a dispute between an insured person and the Insurance Commissioners themselves, and it is inconceivable that Parliament could make the Insurance Commissioners the final authority in their own case. It may therefore be fairly assumed that the Courts will hold that they have jurisdiction to entertain such an action.

If the medical benefit were based upon a reasonable actuarial anticipation of what medical attendance and medicines would really cost, and if it were assumed that doctors were going to be paid a fair fee according to the usage of the profession, then the insurance money ought to be able to provide for such of the insured persons as become ill and require medical attendance, a sum of money equivalent to a bill based upon ordinary reasonable charges for a medical practitioner attending the class of person insured, and therefore there should be no difficulty in the Insurance Fund finding the account which it is suggested should be sued for. It is nowhere laid down in the Act that the medical benefit is necessarily to be financed by what may be called the club-rate system. All that the Act does is to give power to the Insurance Committees to make arrangements, and these arrangements may be in the form of a club-rate system, but that of course depends upon the consent of the medical men to come in on that basis.

There is a great deal of talk about the amount of money which under the finance of the Act is available for medical benefit and remuneration of doctors. It is always assumed that the cash benefits must be kept up at the rates detailed in Schedule IV., but this is an entire mistake. The Act contemplates the rate of sickness benefit being altered—either being raised or lowered, and being postponed or ante-dated according as experience shows the finance works out. Societies are, of course, bound to find these rates of benefit until the first valuation, which must take place before the end of the third year; but once the valuation has been taken, then by sections 37 and 38 sickness benefit will be adjusted so as to make the finance actuarially sound. If medical benefit is to be supplied either by a higher club rate than 6s. per annum, or by the Insurance Committees simply paying the doctors' accounts at reasonable rates, and if the latter system is adopted and turns out to cost more than 6s. per head, then it may, and probably will, turn out that the funds will not supply sickness benefit at 10s. per week.

The cost of medical benefit, sanatorium benefit, and administration by the Insurance Committee are a first charge upon the money standing to the credit of the approved societies with the Insurance Commissioners; and as these charges must be met as explained above, the finance of the approved society for the purpose of the cash benefits administered by itself will depend upon how much money is spent upon medical benefit and cost of

administration, the cost of sanatorium benefit being fixed. Therefore, ultimately the cost will fall upon the approved societies, and will result either in sickness benefit being reduced in the case of normal or weak societies, or in sickness benefit not being increased in the case of strong societies which would have been able to increase it if medical benefit could have been supplied at the 6s. rate estimated by Government actuaries—that is, always assuming that the 6s. turns out to be too low. There is therefore no necessity to go to Parliament at all about the matter, and when Mr. Lloyd George says that he is not prepared to recommend to Parliament a tax of £4,000,000 per annum to double the income of the doctors, he is merely perorating. There is no necessity for him to go to Parliament at all. Parliament has already dealt with the scheme, and the Act contains the decision of Parliament and has provided for all contingencies. If Mr. Lloyd George and others have failed to understand what Parliament has passed, and so have deceived people into imagining that Parliament had provided for sickness benefit at the schedule rates, that is not the fault of Parliament, and Mr. Lloyd George must explain away his statements as best he can.

There is, of course, a provision in section 15 (7) and (8), and also in section 17 (2) and (3), for the laying of the extra cost of medical and sanatorium benefit upon the rates and upon the taxpayer; but this depends upon the consent of the local authorities and the Treasury, the latter, of course, meaning Parliament, because the Treasury cannot sanction expenditure unless the vote is confirmed in the House of Commons. It is always open to the Insurance Committees to enter into an arrangement with the doctors upon terms which the doctors will accept, and to estimate what will be the cost of carrying out their contract. If the Insurance Commissioners only allow 6s. per head, and if medical benefit is going to cost more, the Insurance Committees must simply report that they estimate for a deficit. The Insurance Commissioners must then transmit to the Treasury and to the local authorities the estimate, and ask them if they are willing to find from the rates or the taxes respectively the necessary money. It is extremely probable that the local authorities, at any rate, will refuse, and it is also probable that the Treasury will make their consent depend upon the consent of the local authorities; and if this is the result, then the cost must fall ultimately upon the approved society, that is to say, upon the insured persons, as explained already. It is, of

course, always open to Parliament to pass an Act granting the necessary money out of the taxes, but Mr. Lloyd George has repudiated that suggestion.

If we assume that the result of these provisions will be a deficit in the societies, then they have the alternative of either reducing the sickness benefit or laying an extra levy upon their members, and it will be for the societies to decide which they will do, subject to the consent of the Insurance Commissioners, which, it may be assumed, will not be withheld so long as the scheme proposed is actuarially sound. If we take the last method as the one most probably to be adopted, and if we assume that the Chancellor's estimate of 6s. per annum is the most which the fund can find for medical benefit on its present basis, and that 10s., including medicines, is what medical benefit will cost, then the deficit would be 4s. per head of insured persons, or practically one penny a week, so it really amounts to this—that the societies, in order to obtain absolutely adequate medical attendance and to put their members upon a sound business footing with the doctors, viz. in such a position that they can really demand attendance as of right and not as of charity, there would require to be an extra levy of one penny per week.

When we consider that adequate medical attendance is not only absolutely essential to make the scheme any use at all from the point of view of health, but also that honest and adequate medical supervision is absolutely essential if the societies are to have any check upon malingering, and therefore to retain their solvency, the sum of one penny per week does not seem in any way excessive.

The existing flat rate of contribution does undoubtedly seem hard upon certain classes of low-paid labour, and it has always been the custom of medical practitioners in the past to do a very large amount of charitable work for people in that position. If the comparatively well-to-do artisan class who have no desire to be beggars, and who do wish to pay their way, are subjected to a levy which will enable them to pay their doctors a reasonable remuneration, then the doctors would in all probability be very glad to attend the really poor people at a lower rate. It surely will not pass the wit of man to devise a scheme whereby the extra penny levy is only to be put upon men earning a good wage, say 30s. a week, and that all under that will be able to get medical benefit at the 6s. rate. Of course all this ought to have been thoroughly discussed and worked out before the Act was ever passed, and if confusion has now resulted no one is to blame except the Chancellor of the Exchequer.

CLINICAL RECORDS.

A REPORT OF A CASE OF INSANITY ASSOCIATED WITH
CHLORAL BROMIDE POISONING AND A BRAIN
ABSCESS.

By ALEXANDER W. NEILL, M.D.,
Assistant-Physician, Royal Edinburgh Asylum ;

and

WINIFRED MUIRHEAD, L.R.C.P.(Edin.),
Pathologist, Royal Edinburgh Asylum.

THIS case appears to us worthy of record because of the interesting combination of factors in the production of the psychosis.

CASE.—Mr. J. B., 44 years of age, married, merchant, admitted to the Royal Edinburgh Asylum on 30th June 1909.

Family History.—Paternal uncle was insane : no other evidence of a neuropathic nature was elicited.

Personal History.—The patient was a tall, well-built, muscular man, with heavy but symmetrical features, prominent forehead, and very bushy eyebrows. His eyesight was defective, due to marked myopia. The general physical health had been always extremely good.

From the psychical point of view he was not a normal individual. As a boy he was asocial, disinclined for outdoor exercise, and never entered into the spirit of games with normal zest ; as a man he was moody and self centred. In business he had not been successful ; latterly his financial affairs had been slightly embarrassed, and this was the reason given by his friends for his mental breakdown.

He had suffered from insomnia for some considerable time, and recently was addicted to the use of drugs to induce sleep. The sedatives taken were veronal, grains vii., and potassium bromide, grains xxx., which were only taken at night. He had been temperate in the use of alcohol, and there was no history of venereal disease.

History of Illness.—Patient had been rather more moody than usual for some months, and in June suddenly became acutely depressed. On the 20th inst. he attempted to commit suicide by taking 100 grains of chloral hydrate with 200 grains of potassium bromide in one dose. As a result of this he became extremely excited, and was removed to the Royal Infirmary, where he remained for eight days. During this period excitement was the prominent symptom, and the case was looked on as one of chloral poisoning. On 30th June, 10 days later, he was admitted to the Royal Edinburgh Asylum.

Condition on Admission.—The patient presented the typical mental symptoms of Korsakoff's psychosis, without any of the usual accompanying signs of polyneuritis. He was acutely excited and agitated, with complete disorientation for time and place. Hallucinations of sight and hearing were present, and he also had illusions of identity. The amnesia was marked. He could not retain conversation which had taken place a few minutes previously, although his attention was easily held, and he comprehended questions. He would relate imaginary occurrences, and was perfectly willing to concur in any suggestion offered to him to modify these confabulations and pseudo-reminders. A slight amount of anxiety was also present—he had the fear that he was to be court-martialed. The patient had no realisation of his condition.

Physical Condition.—The tongue was thickly coated and fissured; pupils equal, reacted very sluggishly to light but normally to accommodation. A fine tremor of the tongue and of the muscles of the face and arms was present. The tendon reflexes were slightly exaggerated, but Babinski's reflex was not elicited. Bowels were constipated. His articulation was not impaired. White blood corpuscles 14,370.

Progress of Case.—His mental condition remained in the same more or less acute state as on admission until the beginning of August, when improvement was apparent; the hallucinations disappeared, orientation as to time and place became gradually established, his physical health improved, the pupils reacted normally, and the tendon reflexes were no longer exaggerated. The memory slowly returned, and at the end of this month he had completely recovered from all acute mental symptoms. He could converse intelligently, his memory was perfect, but there remained a certain slight depression, which, however, was not sufficiently marked to have prevented his removal on trial in December to his friends had they so desired.

Early in the spring the depression became more intense; he was lethargic, would not interest himself in his surroundings, refused to be employed, and, although he could converse and play bridge, it was with difficulty that his attention could be retained for any period of time.

He himself took a pessimistic view as regards his own ultimate recovery, and always said, "If only I could get rid of the trouble in my head I would be right." He from time to time complained of frontal headache and vertigo, and occasionally of a feeling of nausea with flatulence. These symptoms were considered to be gastric in origin, and were of so slight a character as not to necessitate any treatment in bed.

In the commencement of May 1910 acute physical symptoms appeared. The patient complained of a feeling of fulness over the epigastrium, associated with nausea; no emesis, however, occurred until the 17th inst., when severe frontal headache appeared, accom-

panied by a persistent nausea and vomiting, which was irrespective of the ingestion of food. The temperature rose to 100° F., and remained so for three days, the pulse-rate being 84. The temperature then fell to subnormal, and did not rise again till just before death, and the pulse averaged 70. At this time there was a slight degree of jaundice, the headache was constantly present, the patient was drowsy, and usually slept for about 9 hours. In spite of a very limited peptonised diet, and the administration of nutrient enemata, vomiting persisted, and was of the cerebral type, being sudden and effortless, any change of position exciting emesis.

Physical examination a few days before death showed exaggerated tendon reflexes on the right side and Babinski's sign; on the left side the tendon reflexes were normal, and plantar extension could be elicited. Sensation over the left side of the body to temperature, touch, and pain appeared slightly dull compared with the right side. On examination of the eyes it was found that no optic neuritis or engorgement of the vessels was present. Staphyloma posticum was found in the left eye.

On 18th June patient was much collapsed, and complained of very persistent severe frontal headache, with continual sickness; temperature subnormal, pulse 70.

On 20th June he became unconscious with stertorous breathing, but not of the Cheyne-Stokes type. Temperature rose to 105° F. and death supervened exactly a year after the onset of the acute symptoms of insanity.

Autopsy.—Examination of the head only was allowed. The calvarium presented no abnormalities; the dura mater was slightly adherent to the bone, the pia-arachnoid appeared normal, the cerebro-spinal fluid was clear and not increased in amount. The brain weighed 49 ounces.

The convolutions of the cerebrum were markedly flattened in the left frontal region. Here, also, at the extreme anterior end the brain was exceedingly soft, and embedded in it was found a small round tumour about the diameter of a sixpence, covered with dura mater which it had not pierced, and apparently attached by it to the base of the skull forming the roof of the orbit. Unfortunately in removing the brain the surface in this softened area was ruptured into an abscess cavity.

The abscess cavity, which was full of greenish pus, and from which was obtained a pure culture of *streptococcus pyogenes*, was about the size of a small walnut, and occupied the left anterior and lower frontal region. It was bounded posteriorly by the lower end of the inferior frontal gyrus, below by the orbital gyri lying anterior to the transverse orbital sulcus, above by the mid-frontal gyrus, and anteriorly by the extremities of the superior and middle frontal gyri. The whole abscess cavity was anterior to and did not implicate Broca's convolution.

The abscess wall was thick and well formed posteriorly above, and below: anteriorly, the thinnest shell of brain tissue existed between the abscess cavity and the membranes of the brain. The brain tissue adjacent to the wall of the abscess was softer than normal, and showed small areas of acute inflammation. This condition was most marked posteriorly, and corresponded to the microscopical findings.

The base of the skull forming the roof of the left orbit presented four small very hard subdural bony excrescences somewhat like peas, although they varied in size and shape: attached to the anterior one of these prominences by a thin fibrous attachment, and dura mater about one inch in length, was the bony tumour already mentioned. This latter tumour was much softer than those at the base of the skull, and appeared to be of comparatively recent growth. The bony growths of the base were pressing on the brain in the anterior orbital gyri of the frontal region. The crista galli and ethmoid were not implicated. In order to avoid disfigurement only the frontal bone in the region of the tumour was removed, and in doing so an interesting condition of the frontal sinuses was discovered. The left frontal sinuses were completely closed by the formation of bone, so dense that it was found difficult to chisel through it. The same condition existed, but to a much less extent, in the right sinus—a protuberance of bone about the size of a bean projected from the middle line into the sinus chamber. The ethmoidal sinuses and bone generally appeared healthy. The whole condition was thus subdural. The bony overgrowth in the sinuses and the excrescences consisted of very hard bone, with the exception of the attached tumour, which was much softer and from which sections were made.

Histological Examination.—The bony tumour showed the structure of an osteoma, and was permeated by blood-vessels (Ford Robertson). The cerebral tissue in the region of the brain in contact with the walls of the abscess cavity was examined and showed an increase of round cells, free to a certain extent, but largely connected with blood-vessels. Around the latter the cells were strikingly abundant, and so dense that in many instances it was difficult to say whether the vessels were arteries or veins, but both were implicated, although the condition was more intense in the veins. The infiltrating cells were principally in the adventitia, but many of the vessels showed disintegration and proliferation of the cells of the intima, which projected into the lumen of the vessel. The nature of the cells varied: the majority were lymphocytes and large mononuclear cells, but there were also a few polymorphonuclears and plasma cells. In any area of the sections with acute inflammatory softening and necrosis the infiltrating cells were found to consist largely of polymorphonuclears, as well as lymphocytes and mononuclear cells, and also a few of Nissl's vacuolated cells or Gitterzellen were present.



FIG. 1.—A PIECE OF THE ORBITAL PLATE OF THE LEFT FRONTAL BONE, ANTERIOR FOSSA, SHOWING FOUR OSTEOMATA.

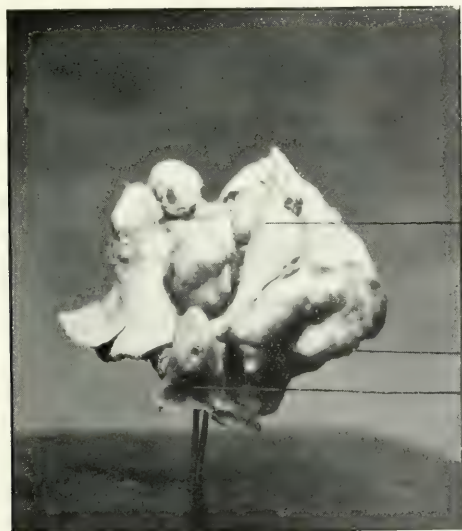


FIG. 2.—SIDE VIEW OF THE SAME FROM THE RIGHT.

1. Frontal crest middle line.
2. Projection of dense bone into the right frontal sinus.
3. Crista galli.

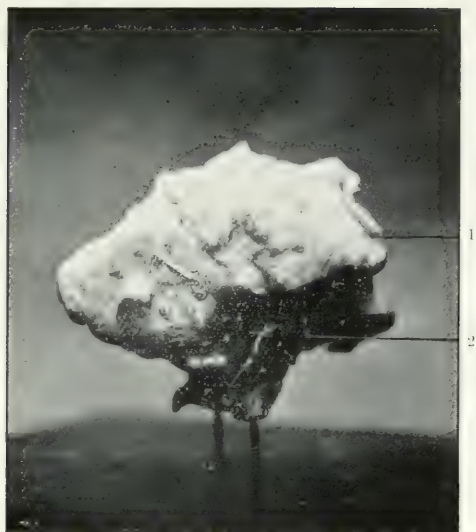


FIG. 3.

1. Shows the dense bone filling the frontal sinuses.
2. Roof of the orbit.

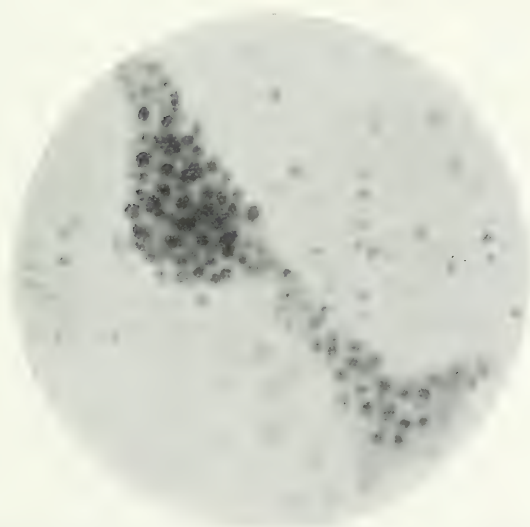


FIG. 4.—SECTION OF BRAIN NEAR THE WALLS OF THE ABSCESS SHOWING THE INFILTRATION OF THE CELLS IN THE ADVENTITIA OF A BLOOD-VESSEL.

All the sections, especially in the area with cellular infiltration, were carefully examined for streptococci, but none were found. The striking features were the cellular infiltration around the vessels and capillaries, and the acute inflammatory softening in the neighbourhood of the vessels, which point to the blood-stream as the source of the spread of the infective condition beyond the walls of the abscess.

On admission the case was regarded as the result of poisoning, due to chloral and bromide, and was classified as a toxic insanity presenting the mental features of Korsakoff's psychosis. This conclusion appeared to be confirmed by the rapidity with which the acute mental symptoms subsided.

With the disappearance of the acute symptoms he was looked on as an atypical case of melancholia, which condition had existed prior to the exhibition of the drugs.

The symptoms of which the patient occasionally complained, such as vertigo, headache, and nausea, were never so severe as even to suggest any gross cerebral lesion.

Early in May the patient's symptoms were regarded as an acute gastric influenza, and were treated on this assumption, and it was not until the middle of May, when they assumed a more serious aspect, that the possibility of a cerebral lesion—probably a tumour—was considered. No localising symptoms were, however, apparent. The character of the vomiting, the persistent frontal headache, the vertigo, and the tendency to sleep and drowsiness were the symptoms on which the diagnosis of a cerebral lesion was based. The sudden rise of temperature and its subsequent fall and continuance at a subnormal level, the absence of optic neuritis, and the acuteness of the condition are all symptoms which might have suggested to us that the condition was an abscess. Unfortunately a leucocyte count was not made. During the course of the illness the pulse never fell below 70, which is an interesting point, as slowing of the pulse is a symptom which is recorded as commonly present in cerebral abscess. Ballance¹ considers that the character and virulence of the organism is possibly largely responsible for the production of this symptom. The severe frontal headache and the absence of any localising symptoms were indicative that the lesion was probably in the fore part of the brain. It was not, however, until a few days before death that the exaggerated tendon reflexes and Babinski's reflex on the right side gave us a clue that the condition was a left-sided one.

There is apparently a definite connection between the bony

tumour and the abscess. The frontal sinus lesion and the osteomata of the base of the skull, judging by the extreme density of the bony formation, had apparently existed for a long period: on the other hand, the softer osteoma which was attached to the base of the skull by a fibrous pedicle, and which was buried in the brain tissue, appeared of much more recent growth. One of two things may have occurred. It is reasonable to suppose that probably the brain had become accustomed to the pressure of the tumours on the base of the skull, but the more rapid and acute growth of the small attached tumour, acting like a trauma or foreign body, may possibly have been the deciding factor in the production of the abscess; or else the chronic osteomata acted in a similar manner, and in consequence the adjacent inflammatory condition in the brain stimulated the bony tumour to an active condition of growth, which resulted in the production of the detached tumour. On the latter alternative the growth of this tumour and the abscess were more or less interdependent, and it is quite feasible to attribute the acute and fatal exacerbation of the abscess to the increased pressure and irritation of the tumour projecting into the brain in the extreme anterior frontal region, and it was here that the abscess was found penetrating to the surface.

What is the relationship of the abscess to the acute attack of insanity which occurred a year before death?

Lesions of the frontal lobes, whether abscess formation or tumours, often give rise to mental symptoms, which vary very considerably. There may be apathy and depression, excitement, confusion, so-called "facetious mania," and even violent delirium. Oppenheimer² has given many references to mental symptoms associated with abscess and tumour in the frontal region. Serog Max³ has recently described three cases of frontal tumour with mental symptoms, and he is inclined to consider as due to pressure mental symptoms such as Korsakoff's syndrome, mania, depression, confusion, etc., which are associated with tumours in any part of the brain. Ford Robertson⁴ records the case of a woman with a strong hereditary predisposition to mental disease, in whom a rapidly growing osteoma in the region of the left coronal suture pierced the dura mater and penetrated the brain tissue to the white matter, and caused an acute and fatal attack of insanity: there was, however, no abscess formation. Oppenheimer, Byrom Bramwell,⁵ and Risien Russell⁶ all emphasise the fact that cerebral abscess may exist in a latent condition for weeks, months, or even years. If the abscess is latent for any lengthy period it

is usually encapsulated, and may remain unchanged for any period of time, or the process may extend by inflammatory softening of the surrounding brain tissue, or by actually breaking through the capsular wall. In this case the abscess walls were thick and well formed, except in the extreme anterior end where the pus was penetrating the surrounding tissue. The brain in the neighbourhood was also softened and showed areas of inflammatory necrosis. If we can regard the thick walls of this abscess as a sufficient indication of latency, then both from the appearance of the abscess anteriorly and the surrounding brain tissue, as well as from the physical symptoms in May, the condition must have undergone an exacerbation.

Before the onset of the acute attack of delirium the patient was definitely depressed for several months, and the cause assigned for this condition was business worries. It would be difficult to prove that the abscess existed at this period and was the cause of the melancholia. The depression culminated in an acute suicidal effort by poisoning with bromide and chloral, which immediately resulted in an attack of delirium, from which the patient recovered in six weeks, leaving, however, the condition of depression which had primarily existed. The rapidity with which the acute mental symptoms had subsided, also the speedy disappearance of the tremors, and the return of the pupils and the tendon reflexes to a normal reaction are all points in favour of the chloral-bromide poisoning being the exciting cause of the delirium. In a recent paper D. K. Henderson⁷ has described a case of delirium due to bromide poisoning in an epileptic in whom both the mental and physical symptoms rapidly disappeared.

On admission the patient was in a lowered physical condition. The whole gastro-intestinal tract was deranged, and it is possible that the commencement of the abscess-formation was determined at this period. The brain, owing to the acute mental excitement, was in a condition of altered metabolism, consequently the existing equilibrium between the osteomata of the skull and the brain may not have been maintained, and thus if there was any inflammatory condition in the near neighbourhood, such as in the nasopharynx, it is conceivable that absorption of organisms might take place by the lymphatics and settle in the disturbed area. The evanescent attacks of headache, vertigo, and nausea might easily have been due to the symptoms of a latent abscess or to the increased growth of the osteoma, whilst the depression and apathy, which really increased in intensity, could be attributed to the same cause.

One other point that might be raised is, What was the cause of the original depression? It is true that the patient was a man whose predisposition was such that a mental breakdown was not surprising. He had been inadequate in everyday life, and had proved incapable of managing his affairs, and financial difficulties were stated by his friends to be the cause of his depression. It might, however, be argued that the original attack of melancholia was due to the chronic osteomata of the base of the skull, by causing pressure on the frontal region of the brain in a person with an hereditary predisposition towards insanity.

CONCLUSIONS.

- I. We have endeavoured to demonstrate that there was a combination of 4 factors in this case—(1) Predisposition to insanity. (2) Acute poisoning with an overdose of chloral and bromide. (3) Osteomata of the base of the skull. (4) A frontal abscess.
- II. We are inclined to consider that the acute attack of insanity was a toxic condition due to poisoning with chloral and bromide, and we base this assumption on the fact of the rapid recovery from both the mental and physical symptoms.
- III. The osteomata of the base of the skull were a chronic condition, and their presence may have had a close relationship to the melancholic state of the patient. We consider that these tumours were the determining factor in the production of the abscess.
- IV. The frontal abscess may have existed in a latent condition for some considerable time; our reasons for making this statement are the existence of the thick walls of the abscess cavity, and also the fact that both mental and physical symptoms were present which could have been caused by such a latent abscess.
- V. It is possible that, owing to the lowered physical condition of the patient, the abscess developed during the attack of acute insanity a year previous to death.
- VI. Death was due to an acute exacerbation of the abscess condition.

In conclusion our thanks are due to Dr. G. M. Robertson, Physician Superintendent of the Royal Edinburgh Asylum, for permission to publish this case, and to Dr. Ford Robertson,

Director of the Laboratory of the Scottish Asylums, for the histological report on the bone tumour.

REFERENCES.—¹ Oppenheimer, *Text-Book of Nervous Diseases*. ² *Ibid.*
³ Serog Max, "Die psychischen Störungen bei Stirnhirntumoren," *Zeitschr. f. Psych.*, vol. lxxiii. No. 5. ⁴ Ford Robertson, *Text-Book of Pathology of Mental Diseases*. ⁵ Byrom Bramwell, *System of Medicine*, Albutt and Rolleston.
⁶ Risien Russell, *Text-Book of Medicine*, ed. G. A. Gibson. ⁷ D. K. Henderson, "On Delirium Due to Bromide," *Edin. Med. Journ.*, June 1912.

NOTE ON A CASE OF PRIMARY SARCOMA OF THE SACRUM.

By J. LAMOND LACKIE, M.D., F.R.C.P.

PAIN in the back is such a common complaint in gynaecological disease that one is not surprised when it is mentioned as one of the symptoms in nearly every abnormal condition in the pelvis. I wish to state a case in which pain in the back was the only symptom of which the patient complained, and in which the cause, though most obscure at first, proved to be the very rarest that could be met with.

Mrs. M., æt. 60, came to see me in September 1911 complaining of a gradually increasing pain in the back. It had commenced in spring, and had been getting worse all summer, till in September it was so overpowering that she could move about only with great suffering. On examination very little abnormal could be made out. The uterus was somewhat enlarged, was retroverted, and lying somewhat low in the pelvis. The displacement, however, could not be considered abnormal at the age of 60, but in order to exclude it as a possible cause I replaced the uterus and introduced a pessary. Curiously, next day the patient said she felt very much better, and on the following day she left the nursing home and travelled to Argyllshire. Two days later she telegraphed that the pain was unbearable, and requested me to send her a sedative. Heroin was sent, but the necessarily small doses I ordered had little effect in alleviating the suffering. Within a week she was back in a nursing home here, and once again one tried to discover the cause of the great pain, which seemed to continue without intermission. Day after day Mrs. M. was carefully watched by skilled nurses, who assured me there was no doubt about the acuteness of her suffering. Both day and night were spent in misery. Very soon full doses of heroin, and later of omnopon, were necessary, and if these were withheld the suffering was described as agonising. Iodide of potassium was given in large doses, and every possible analgesic of the coal tar series was tried, but all with no effect. It was not till after fourteen days that one realised that the pain must be due to

something in the spine itself, and at this stage I asked Dr. Gulland to see the patient with me. He agreed that the case was one of either severe neuralgia or one of malignant disease of the sacrum, and advised that a skiagram be taken. This was done by Dr. Price, and the photograph indicates disease of the upper part of the sacrum. It was concluded by Dr. Price and Dr. Gulland that there was probably a sarcoma of the bone, and this view proved correct. For many weeks the patient remained in Edinburgh, being confined to bed, requiring increasing doses of morphia to control her suffering. In December she was moved to London, but before this it was possible to detect externally a marked fulness of the bone on the right side, while per vaginam nothing of the tumour could be felt. In London Mrs. M. became gradually more and more emaciated and weaker, while the pain never lessened. Treatment by radium was carried out, but I understand it had absolutely no effect. She died on 23rd January 1912 with unmistakable signs of a secondary deposit in the brain, but there was no localising evidence. Her doctor wrote me that the swelling on the right side of the sacrum had become more pronounced as time went on, but not to any great extent.

Although secondary deposit of sarcoma and cancer occur fairly frequently in the spine, primary sarcoma of the vertebral column is very rare, and especially so in the sacrum. It is for this reason that I venture to record the case. It is not strictly gynæcological, but the main and only symptom was the commonest of which women complain in pelvic disorders, and it may be well to remember the remote possibility of this pathological condition in cases of otherwise unexplainable "pain in the back."

OBITUARY.

DR. WILLIAM JEFFREY OF JEDBURGH.

ON the 16th of July, in the quiet country town of Jedburgh—in the Borderland he loved so well, and where he had laboured for more than forty years—there passed to his rest a singularly cultured, high-souled, human-hearted, and eminent member of the profession—William Jeffrey.

Born in Berwickshire some seventy years ago, the son of a man who in his day was one of its best known and most highly respected practitioners, and from whom he inherited much that tended to make him what he became—his fine physique and striking presence, his notable musical gifts and love of literature, and, best and chiefest of all, his strong clinical instinct, which made him in early days in the hospital wards a most distinguished student and in after-life one of the most reliable and able of general practitioners.

As resident physician in the Royal Infirmary to the late Dr. Warburton Begbie, who was a man after Jeffrey's own heart, he belonged to a group of residents of whom several rose to much distinction in their profession, and of whom there are now but few survivors, Sir Dyce Duckworth being the best known. He, in his graceful and appreciative introduction to the published works of Warburton Begbie, has testified in strong and kindly words to the very high qualifications and the rare gifts of the man who is the subject of this notice.

Eschewing that to which he might well have aspired—a metropolitan practice, with the honours and success it was certain to have brought to him—he chose the strenuous life of a country doctor, a most happy choice for the dwellers in the widely-spread area in which his lot was cast.

A master in his profession and in all its branches, Jeffrey possessed in full measure the knowledge which comes from wide and constant reading and most carefully garnered practical experience, and as a result he had that well-founded self-confidence and quick and ready judgment which, to a man placed as he often was—far from professional help—are of paramount and inestimable value—a value demonstrated by his sole and successful management of many a grievously bad labour and the performance of not a few of the major operations of surgery, his coachman at times acting the part of anaesthetist. To-day the Scottish Border mourns his loss. To many of its scattered inhabitants the sunshine on the soft green slopes of the Cheviots is not so bright as it was wont to be, and in the days to come—they will be long and many—the name of William Jeffrey will be honoured and cherished, for he is one of those of whom it may be written in the words of one of his favourite authors, “The best part of a good man's life are his little unremembered acts of love.” Jeffrey's life was, as are indeed the lives of many doctors, full of these—acts, the thought and knowledge of which drew forth from a great Scottish thinker and divine this belief: “The evil that men do lives after them, but I do not believe the *good* is often buried with their bones. It rises from their graves and walks the earth until the resurrection morning.”

Of many a doctor of Jeffrey's type this belief surely must ever hold good.

To Mrs. Jeffrey and the family, of which the two sons are distinguished members of our profession, the sympathy of many sorrowing friends will be warmly extended.

J. A. M.

RECENT LITERATURE

CRITICAL SUMMARIES AND ABSTRACTS

MEDICINE.

By JOHN D. COMRIE, M.A., B.Sc., M.D., F.R.C.P.,
Lecturer on History of Medicine, University of Edinburgh.

UNILATERAL EXOPHTHALMOS.

UNILATERAL exophthalmos in Basedow's disease is not by any means unknown, though it has been described in a comparatively small number of cases. Worms and Hainant detail a case of exophthalmic goitre, with two illustrations, in which the left eye only was affected (*Gaz. des Hôp.*, 20th June 1912). They quote the inaugural thesis at Lyons in 1910 of Legras de Vaubercey, who collected most of the cases that had been recorded, numbering 48; and they give references to other 23 cases in which the left eye was affected, and 20 cases in which the right eye was protruded, thus making in all 91 recorded cases. Taking the latter 43 cases, they found that in 17 the goitre and the ocular protrusion were on the same side, in 6 cases there was crossing of the two symptoms, while in 13 cases the thyroid enlargement was little, if at all, to be made out. The writers discuss the various theories that have been advanced to account for exophthalmos. They reject for various reasons the vascular theory, according to which the eyeball is supposed to be pushed forwards by dilatation of the vessels behind it. For example, if it were due to vascular dilatation, there would certainly be throbbing between systole and diastole; it would also be difficult to explain why the condition should be relieved by section of the sympathetic, and how, in these unilateral cases, one eye only could be affected. The writers therefore incline to the muscular theory, by which the exophthalmos is supposed to be due to irritation of the sympathetic and consequent contraction of the orbital muscle fibres associated with the capsule of Tenon.

SARCOMA INFECTION.

The nature of sarcoma infective material in the fowl has been investigated by Rous and Murphy (*Journ. Amer. Med. Assoc.*, 22nd June 1912), who have by a series of experiments on chickens found out several points as to the conditions of transmissibility. For example they found that heating to 55° C. for 15 minutes destroyed the infective agent, that toluol and chloroform in the proportions employed to prevent bacterial

growth will destroy it in less than two hours, as also 50 per cent. alcohol and 2 per cent. carbolic acid. Like animal organisms, as opposed to most of those of a vegetable nature, it is easily destroyed by bile and saponin; chicken- or rabbit-bile in 50 per cent. strength deprives it of activity, and saponin does so in dilution of 1 in 800. On the other hand the agent could survive drying for 7 months and immersion in 50 per cent. glycerine for at least one month, though in both cases it appeared to be attenuated, as judged by the tumours it produced. When emulsions of tumours were filtered the infective material could pass through a Berkefeld filter, but was retained by a Chamberland filter. Although the agent is unknown, these authorities conclude that, generally speaking, its characters are those which we associate with micro-organisms.

BERIBERI DUE TO FLOUR.

Beriberi in the East is now generally admitted to be due to the eating of polished rice. Little (*Journ. Amer. Med. Assoc.*, 29th June 1912) describes cases with which he has met in Newfoundland where fine white flour appeared to be the cause. Many people in that country come down in winter and spring to a diet of bread and tea, and are apt to develop night-blindness, numb and cold feelings, tinglings, and other paræsthesiæ. Unless these be obviated by appropriate diet a rapid advance sometimes takes place, with sensory and motor paralyses, œdema, and involvement of the nerves in important organs like the heart. On the other hand, a diet of whole wheat flour, beans, and peas may be followed by complete recovery of a helpless patient in two months.

SALVARSAN.

Salvarsan is used in many ocular troubles connected with syphilis, though, as is well known, some conditions of the eye contra-indicate it. What these conditions are is outlined by Reese (*New York Med. Journ.*, 29th June 1912), who found, for example, that one case of tabetic optic atrophy that had been growing very slowly worse over several years lost the sight completely within 6 weeks of a salvarsan injection. He has formed the opinion that it should not be used when there is any primary atrophy of the optic discs, although it gives excellent results in cases of neuro-retinitis. The writer quotes Stuelp, who says that 81 per cent. of the cases of choked disc due to neuro-retinitis and 63 per cent. of cases where the syphilis affected the uveal tract were cured by the use of salvarsan.

That salvarsan destroys the immunity against syphilitic infection as well as cures the manifestations of the disease is proved from cases recorded by Cunningham (*Bost. Med. and Surg. Journ.*, 20th June 1912). He had one patient treated six weeks after the primary lesion, from

whom all symptoms disappeared in ten days, but who showed a new genital sore and secondary symptoms two months later. In another case with well-marked primary sore and secondary symptoms, which disappeared within two weeks after administration of salvarsan, the patient became reinfectd on the penis, and had typical secondary manifestations within nine months of the first infection. A preliminary note upon neosalvarsan is contributed by Rytina (*New York Med. Journ.*, 29th June 1912). After the use of salvarsan about 500 times he has come to the conclusion that the early anticipations which regarded it as a certain steriliser of the syphilitic virus have not been fulfilled. He finds that neosalvarsan is more simple to use, requiring merely to be dissolved in plain water without any neutralisation: that it is suitable for intra-muscular injection, which allows of a larger dose being used, and gives a more prolonged action. The method of employment recommended by this author is to inject into the muscles 0.9 gm. of neosalvarsan dissolved in 5 to 10 c.c. of water, and to give four such doses at intervals of a week. The immediate results as regards disappearance of spirochaetes from chancres, mucous patches, etc., within 24 to 48 hours are quite as good as those given by salvarsan.

Perussia (*Munch. med. Wochenschr.*, 2nd July 1912) and Vallardi (*ibid.*) describe cases of splenic anaemia in which a cure had apparently resulted from the use of salvarsan. In the former case the red blood corpuscles numbered 1,990,000, white blood corpuscles 4800, haemoglobin 22 per cent., with great hardness and enlargement of the spleen. There was no history of syphilis, and the Wassermann reaction was negative. After three injections of salvarsan at intervals of a month the blood showed red corpuscles 3,360,000, white corpuscles 4400, haemoglobin 75 per cent.: the spleen was much smaller and the patient greatly stronger and better. In the other case with similar symptoms the blood count rose from, red corpuscles, 1,300,000; white corpuscles, 3500; haemoglobin, 27 per cent.: to, red corpuscles, 4,000,000; white corpuscles, 5000; haemoglobin, 70 per cent., after three injections of salvarsan had been given over a period of five months.

ACIDOSIS INDEX.

While it is very important to obtain some knowledge of the extent to which ketone bodies are being produced by the body in serious conditions like diabetes, the processes required for their estimation are very complicated. Hart (*Quart. Journ. Med.*, July 1912) has, however, devised a rough plan which is not difficult to carry out in order to obtain an acidosis index from day to day in any case that is under observation by the clinician. He prepares (a) a standard solution consisting of ethyl aceto-acetate 1 c.c., alcohol 25 c.c., and distilled water to 1000 c.c.; (b) ferric chloride solution, consisting of 100 grms.

of ferric chloride dissolved in 100 c.c. of water. The standard solution is used as a colorimetric index. Two test-tubes are taken: in one is placed 10 c.c. of the urine to be tested, in the other 10 c.c. of standard solution, and 1 c.c. of ferric chloride solution is added to each. If the resulting claret colour is deeper in the tube containing urine, this is now diluted down with water till the two match. The bulk of the urine solution in cubic centimetres now represents roughly the number of grammes of diacetic acid per litre of urine. By multiplying this by the number of cubic centimetres of urine passed in 24 hours and dividing by 1000 the patient's "acidosis index" for that day is obtained. This figure is roughly equivalent to the number of grammes of ketone body passed by the patient in twenty-four hours.

RIVALTA REACTION.

The reaction of Rivalta for the differentiation of collections of inflammatory exudate from merely transuded fluid has been investigated by Merklen, Regnard, and Bonvalet (*Gaz. des Hôp.*, 27th June 1912). Its technique is very simple. A test-tube is partly filled with distilled water weakly acidulated with acetic acid, and a drop of the effusion to be tested is allowed to fall into it. If the effusion is an inflammatory one (exudate) the Rivalta's test is positive, that is to say that one sees falling through the water a faint precipitate like a wreath of thin smoke. If the fluid is merely a passive transudate, then there is no precipitate—the test is negative. Further, the test is of value in the case of certain albuminurias: it is negative with urines which contain albumin derived from the kidney, while it gives a positive result when the albumin is caused by the presence of leucocytes and pus derived from the urinary passages. The writers attribute the positive reaction to the presence of alkali-albumin and nucleo-albumin.

A NEW PLANTAR REFLEX.

A new reflex obtainable from the foot sole is described by Jacobson and Caro (*Neur. Zentralbl.*, pt. 7, 1912). When the foot sole is stroked at its centre or along its inner edge, there follows a sudden twitch in the side parts of the quadriceps, that spreads out into the whole quadriceps and the adductors. The reflex is obtained almost as regularly as the patellar reflex, and it can sometimes be obtained in cases where the jerk obtained by tapping the patellar tendon has disappeared. This demonstrates, when it occurs, some lesion that has interrupted the reflex arc between the second and fourth lumbar segments, but has not interfered with the path by way of the first and second sacral segments, nor the connections between this region and the motor cells of the second to fourth lumbar segments. The reflex belongs to the group of deep reflexes.

SURGERY.

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CONTINUING his articles on the surgery of bones and joints (see this *Journal*, July 1912), J. B. Murphy discusses the surgery of tendons in relation to extra-articular lesions producing deformities of joints (*Journ. Amer. Med. Assoc.*, 1st June 1912). These deformities may result from shortening of tendons through contraction of muscles, as in Volkmann's contracture, paralysis of counteracting groups of muscles, cicatricial fixation or shortening of the capsule, and cicatricial contraction of the skin and fascia.

Volkmann's contracture is a traumatic myositis produced by too tight splints or bandages. It is extremely rapid in its onset, and within forty-eight hours a limb may be permanently damaged. Pathologically, a greater or less portion of the muscle belly is destroyed and replaced by a firm cicatricial mass, which begins to show contraction in four to six weeks, and assumes a fixed condition in ten or twelve weeks. There is no paralysis of sensory or motor nerves. Treatment consists in the correction of the deformity by elongation of tendons, in balancing the muscle groups so that subsequent contraction and deformity do not occur, and in division of the joint capsule to permit of free mobility of the joint. The flexores carpi radialis and ulnaris do not need to be elongated more than $\frac{1}{2}$ to $\frac{3}{4}$ of an inch, but the tendons to the index and middle fingers may be too short by $2\frac{1}{2}$ or 3 inches. If the hand does not remain in position when the tendons have been lengthened and sutured, the capsule of the wrist joint should be divided along its anterior surface, and the line of division covered by a flap of tissue taken from the side of the wrist, thigh, or abdomen. To prevent adhesion of tendons to each other, a flap of fascia and fat should be swung in between them and sutured in position.

Murphy emphasises the necessity of dividing the joint capsule for a permanent good result. For example, in old-standing contractions at the elbow elongation of the biceps tendon is not sufficient, but when the joint capsule is divided, extension may be gradually procured. The stretching of the nerves may result in oedema and muscular paralysis, but the condition passes off in two weeks to four months.

If the contracted tendons are fixed to bone to such a degree that a plastic operation is impossible, sufficient bone should be excised to place the muscles and tendons under favourable conditions for mobility, and adhesion of tendons to bone and skin prevented by the interposition of fat-bearing flaps of fascia.

In congenital deformities of joints, not due to paralysis of opposing groups of muscles, the contracted tendons should be lengthened, the

opposing tendons shortened, and the joint capsule divided rather than lacerated by force. Murphy objects to the heavy crushing instruments at present in use. In addition, the whole or half of a tendon may be transplanted into periosteum or fibrous capsule. Such transplantations, with or without arthrodesis of one or more joints, may yield a good result. Both procedures are, however, secondary to nerve transplantation, the latter being performed some months previously, so that there may be nerve restoration and muscle contraction in effect at the time the tendon transplantation is carried out.

Cicatricial contractions of skin, fascia, and muscles, for example by burns, produce a distressing type of joint fixation. The preventive treatment of such by skin-grafting as soon as the slough has disappeared is all important. When contraction has taken place, if it involves the skin alone, a large pedicled transplant of skin with a considerable amount of adipose tissue from a neighbouring area gives the best result. For the arm, the transplant may be taken from the chest or abdomen; for the leg, from the same or the opposite leg. After the insertion of an elastic skin-flap in the centre of a cicatricial mass, the remaining scar tissue at the extremities is relieved from tension and quickly absorbed. Such a flap may expand to twice its original size in a few months if it is subjected to repeated or continued traction. Much annoyance may be caused by the regeneration of sensory nerves and hypersensitiveness of the scar. More than one pedicled flap may be inserted in an extensive area of contraction.

When the contraction involves also the deeper tissues, tendons should be elongated, and in old-standing cases the joint capsule should be divided. When the tendons have been destroyed to such an extent that their elongation is impossible, homologous transplantation of part of the tendo Achillis or the flexor tendons of the forearm should be carried out. These same tendons may be used as substitutes for ligaments in flail-joints. Silk may also be used to stimulate the growth of a ligament or tendon.

EPIPHYSITIS OF OS CALCIS.

Under the above title Sever describes a not unusual condition met with in children up to the age of puberty, and illustrates it by means of five clinical records and a series of X-ray photographs (*New York Med. Journ.*, 18th May 1912). It resembles the affection of the tibial tubercle known as Schlatter's disease, and it is the result of muscular strain in rapidly growing children, or, less frequently, of direct trauma. The epiphysis of the os calcis, crescentic in section and surrounding the greater tuberosity like a cap, begins to ossify at one or at two centres shortly before the age of seven, and ossification is completed about the time of puberty. In children large for their age the epiphysal development is earlier and greater.

The clinical picture is as follows :—There is a slight persistent limp, with a marked disinclination to complete the full step in walking. The child complains of tenderness about the back of the heel, and this may have been present for weeks or months. There may or may not be a history of injury, but the child is generally overweight for its years, has been very active, and is physically strong. A slight degree of pronation of the foot may be noticed. The tender area is deeply situated in front of the tendo Achillis on either side, where a general thickening partly obliterates the hollows. Any movement, such as full extension of the foot, which puts a strain on the tendo Achillis, causes pain. The tenderness is more extensive and deeply seated than in inflammation of the bursa between the tendon and the os calcis. Calcaneal spurs, which can be distinguished by screening, rarely appear so early in life. Tubercle of the os calcis usually begins in the anterior portion of the bone.

The X-ray findings are constant whenever the ossification of the epiphysis is sufficiently developed to show the characteristic changes. When the centre of ossification is small or absent the changes are not seen. The epiphysis is enlarged both in thickness in the antero-posterior plane and in length from top to bottom. There is also considerable cloudiness along the epiphysial line, or partial obliteration of the line, suggesting a deposit of new bone. Occasionally the radiogram appears to show a slipping of the epiphysis, with inflammatory reaction accompanying the displacement.

The treatment consists in raising the heel of the shoe a quarter to half an inch to relax the tendo Achillis, and fitting in a rubber pad to prevent pounding of the heel in walking. Rest, douching, and strapping may be of great benefit.

INTRACRANIAL ANÆSTHESIA OF GASSERIAN GANGLION.

F. Härtel describes a modification of Schlösser's technique for reaching the foramen ovale from the cheek, and records seven instances of induction of anæsthesia in the fifth nerve (*Zentralbl. f. Chir.*, 25th May 1912). He uses a fine trocar and cannula 9 cm. long, and formed like the instrument used for spinal anæsthesia. An area of the cheek is injected with novocain, and the needle is entered two to three centimetres behind the angle of the mouth. It is pushed upwards between the ascending ramus of the lower jaw and the tuberosity of the maxilla till the infra-temporal plane is reached. Under the guidance of a finger in the mouth this procedure is carried out in such a way that the mucous membrane is not penetrated. The recognition of the infra-temporal plane with the finger is not essential, but it is possible in about seventy-five per cent. of cases. When it is reached with the point of the cannula, this is pushed on exactly

towards the articular eminence of the zygoma. When the third division is reached, as is recognised by the occurrence of pain in the lower teeth, the cannula is pushed on through the foramen ovale into the cranial cavity until pain is felt in the upper jaw. Then $\frac{1}{2}$ to $1\frac{1}{2}$ c.cm. of a 2 per cent. novocain-adrenalin solution is injected as slowly as possible. Anaesthesia begins immediately after the injection, and involves the whole distribution of the fifth nerve. It lasts for one to two hours according to the dose. Härtel has twice employed the method in the treatment of neuralgia of the second division. In the other five cases operations were performed during the anaesthesia—removal of an orbital tumour, with temporary resection of the zygoma; removal of half of the left upper jaw, with scraping of a fistula; chiselling through the canine fossa to drain the antrum of Highmore; extraction of several teeth in both jaws. In these cases the anaesthesia was perfect. In a seventh case, one of the earliest, in which the Gasserian ganglion was diseased, the entrance of the needle was prevented by ossifications resulting from previous operations on the roots. Anaesthesia was complete up to the exposure of the ganglion, and the latter was then directly injected. Härtel claims that the technique is simple, and that the whole side of the head innervated by the fifth nerve can be anaesthetised by a single injection of $\frac{1}{2}$ c.cm. of a 2 per cent. solution of novocain. Operations may then be carried out on the sensitive dura mater covering the base of the skull, the Gasserian ganglion, or the pituitary gland.

LEONTIASIS OSSEA.

From the naked-eye and microscopic appearances in a case of leontiasis ossea, Boit believes that it is identical with the hypertrophic form of ostitis fibrosa (v. Langenbeck's *Archiv.*, Bd. xcvii. H. 3), and proposes the name ostitis fibrosa hyperostotica cranii et faciei. For its origin, such factors as trauma, toxic poisoning, and syphilis are to be considered. On the other hand, myeloid tumours and some varieties of epulis are probably blastomas, and are not to be considered, as v. Recklinghausen thought, as ostitis fibrosa. In ostitis fibrosa cranii early diagnosis and operation are important, not only for the complete removal of the growth, but also for the relief of the brain in commencing compression. As the pathological changes are endosteal, the periosteum may be preserved.

OBSTETRICS AND GYNECOLOGY.

By J. W. BALLANTYNE, M.D., F.R.C.P.,
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THE PREVENTIVE AND MEDICAL TREATMENT OF ECLAMPSIA.

THERE is no subject in obstetrics about which at the present time there is more difference of opinion than there is about eclampsia: and this difference exists not only with regard to its causation, but also in respect of its treatment. From all quarters new suggestions are pouring in upon us, and yet the mortality, both maternal and foetal, remains distressingly high, and there is no maternity hospital whose physicians do not dread the arrival of eclamptic patients. It is well worth while to take a comprehensive view of some of the more recent methods of treatment.

There is good reason to believe that the most satisfactory plan is *prevention*, but this can only be surmised, not proved, for of course it is open to the pessimist to say that no fits would have supervened even if no preventive measures had been taken. As Pinard has pointed out recently (*Journ. m'éd. français*, January 1912, pp. 14-17), the profession is indebted to Professor Tarnier for the introduction of the absolute milk diet into the treatment of albuminuria in pregnancy, for his article on the subject appeared in 1875; but Tarnier in his turn was indebted to Professor Jaccoud, who in 1873 insisted on the value of this strict milk regimen for the prevention of uræmia. Pinard emphasises the importance of albuminuria in pregnancy as a warning sign of impending eclampsia, and states that amongst the two hundred cases of eclampsia which he has dealt with since 1882, there was only one in which it was not possible after several analyses to detect albumen in the urine. Albuminuric women therefore are, so to say, "candidates for eclamptic convulsions." It is the fact of the pregnancy of pre-eclamptic albuminuria which makes the value of the milk treatment so great, for the albuminuria can be easily detected and the patient at once put upon milk. Tarnier tried a mixed diet at first, but later on he recognised the greater value of a milk-only diet, and present-day obstetricians fully concur. Pinard does not think that the temperature of the milk matters much, and as to the quantity taken, he is generally of opinion that the more the better. If the milk is not well borne it has been recommended to give it without the cream, or with water added, or, in very rare cases, to substitute the water diet for it. It must be continued till the albuminuria disappears. Further, the dietetic treatment should be reinforced by some other precautions, such as the wearing of flannel, the keeping of the patient in bed and in a

temperature of not less than 68° F. : she should also make use of drastic purgatives. Other auxiliary methods may be necessary : thus the chloride-free diet is specially useful in the albuminurias which are accompanied by hard œdema ; and the employment of milk-water (*l'eau lactosée*), consisting of 50 grms. of milk to the litre of water, gives good results. When preventive treatment is begun comparatively late in the course of the albuminuria, when, for instance, intense headache is complained of and visual troubles are noted, then bleeding is quite justifiable (from 200 to 500 grms. of blood being drawn off) : leeches may be applied to the mastoid regions, and the loins may be cupped. The question of the interruption of pregnancy for the prevention of eclampsia rarely requires to be considered ; it can arise only when all other means fail to arrest the course of the malady. Pinard is also of opinion that preventive treatment is effective in preventing the occurrence of intra- and retro-placental hemorrhages, lesions which are very fatal to the fœtus and dangerous to the mother.

In this connection Lemeland's careful researches on the elaboration of the food albumens in the pregnant woman who is on a milk diet (*Arch. mens. d'obstét. et de gynec.*, Mai 1912, pp. 431-467) are of great importance. The conclusions to which he comes are that under a milk, as well as under a mixed, diet the healthy woman stores up nitrogen in the last month of her pregnancy. This storing up, at any rate in the first four days of the regimen, is less as compared with the amount of nitrogen ingested in the case of milk diet. Further, the nitrogen is not stored up in the blood in the form of urea, indeed the urea content of the blood seems to be less on the fourth day of milk diet. The total nitrogen content seems to be somewhat raised, and since the relation of the nitrogen of the urea to the total nitrogen is lowered, it seems that we may conclude that the nitrogen retained is nitrogen fixed by the maternal organism in a form which can be made use of for the needs of the different organs and for the development of the fœtus in the last days of antenatal life. Milk diet, therefore, may be regarded as a regimen which is very little toxic, for it sets up a more considerable transformation of albumens into urea and diminishes the quantity of the purin bases. It also counteracts toxic effects by causing a very rapid discharge of nitrogen and so diminishes the urea content of the blood. In the normal woman its action is very rapid, and can be recognised clearly in the first four days.

When convulsions have actually supervened, the obstetrician may adopt a treatment which is mainly medical or one which is largely obstetrical and surgical, or he may combine all the methods in one. What has been described as Stroganoff's prophylactic treatment of eclampsia (*Zentralbl. f. Gynäk.*, No. 14, 1912) is not the same thing as the preventive treatment (to which reference has just been made) : it rather corresponds in some degree to the medical treatment as it is

commonly understood. Stroganoff's four chief aims are as follow :—The first is to avoid as far as possible all external irritants or excitants, and for this purpose the patient should be kept in a dark room, and should receive injections, and have the catheter passed under a slight degree of chloroform narcosis. The second aim is to cut short the convulsions with narcotic medicines according to a fixed plan. Thus, morphia first is given subcutaneously : it is followed in an hour by chloral given per rectum, or by the mouth if the patient be conscious ; then after three hours more morphia is given hypodermically, and then, at increasing intervals (at 7, 13, and 21 hours), chloral again. Chloroform is given only at the beginning of the treatment, and later for the purpose of cutting short the prodromata of attacks. The third aim is to obtain prompt but not as a rule forced delivery. The fourth and last aim is to watch and stimulate the respiration, the heart's action, and that of the kidneys and skin. For these purposes fresh air and oxygen should be given after the fits : the diet should consist of milk : saline injections should be given by the bowel or by the mouth (if the patient is conscious) : the heart should be stimulated by digalen and the kidneys by hot applications. Some five hundred cases of eclampsia have been treated in St. Petersburg along these lines, and with a maternal mortality of little more than 7 per cent., including cases of death from sepsis, hæmorrhage, and pneumonia : the fetal mortality was 21 per cent., including dead-born, premature, and postmature infants. On the other hand the forced-delivery method in St. Petersburg gave a maternal mortality of 20 per cent.

Stroganoff's treatment of eclampsia resembles in many points that followed with gratifying results by Hastings Tweedy at the Rotunda. In Dublin great faith is placed in morphia and in clearing out the bowels, whilst from the obstetrical point of view the treatment is expectant. The treatment which I have followed during the past four years resembles in part that employed by Stroganoff and in part that favoured at the Rotunda, but it also differs from both in some details. I have very seldom used morphia, and I have almost invariably pursued an expectant plan as regards obstetrical treatment. I have concentrated upon venesection, intravenous transfusion with saline, washing out the stomach with bicarbonate of soda solution, the introduction into the stomach by the tube of a large dose of sulphate of magnesia, the use of large enemata, and the hot pack. I have also sometimes used nearly all these measures in the prevention of eclampsia, viz. in patients with albuminuria and the other prodromata of eclampsia : so that in some instances my treatment of both pre-eclamptic and eclamptic cases has been practically the same. Of course the ordinary type of pre-eclamptic case is treated by milk diet, and usually requires little else.

Commandeur (*Journ. méd. franç.*, January 1912, pp. 18-23) has ably summarised the other purely medical plans of treating eclampsia

which are or have been in common use. After pointing out that chloroform, chloral, morphia, and veratrum viride are the four principal drugs which form the basis of the therapeutics of eclampsia, Commandeur recommends that chloroform be used only in urgent circumstances to check the convulsions, and should be given only in small doses. He states that chloral is the greatest favourite among French obstetricians, morphia among the Germans, and veratrum viride among the Americans. Chloral may be given in as large doses as 18 or 20 grms. *per os*, and it is best administered by the mouth (being run in after a preliminary stomach washing): the first dose should be one of 2 grms. well diluted with water, and this may be followed by 1 gm. every hour till sleep is produced. Commandeur's maternal mortality under the chloral treatment was 4 deaths in 45 cases (9.3 per cent.). He is not satisfied with the morphia treatment, and quotes Treub's statistics (63 maternal deaths in 121 cases, or 52 per cent.) in support of the condemnation of this drug. He admits, however, that Stroganoff has obtained excellent results from the use of chloral associated with morphia (6 per cent. mortality in 360 cases), and thinks this method ought to get a fair trial (for details, *vide supra*). Among accessory drugs reference is made to bromide of potash, to guaiacol, hydrate of amylene, hyoscyne, nitroglycerine, trinitrine, calomel, and pilocarpine: but none of these has been very successful, and the last named (pilocarpine) has sunk into deserved oblivion. Bolle's use of iodide of potassium is founded on the resemblance existing between eclampsia in the human subject and parturient apoplexy in cows. The Danish veterinary surgeons got good results with this drug, and Bolle, therefore, has injected the iodide into the mammary gland or into the sub-clavicular cellular tissue, with the result that he has had one death in fifteen cases. The intramammary injection of sterilised air or of oxygen may render the action of the iodide more effectual. Commandeur thinks the use of thyroid and parathyroid extract should be carefully supervised, and believes it to be of more use in the pre-eclamptic stage than later. Another new drug is hirudine or leech extract: it is given in order to hinder the formation of thromboses in the organs which are so frequent in eclampsia, and it acts by diminishing the coagulability of the blood; but it brings with it the special danger of causing hemorrhages during delivery, and further knowledge regarding its action is needed before it can be accepted as a useful means of treatment.

Several physical means of treating eclampsia are in common use at the present time: among these may be named bleeding, subcutaneous injection of saline, lumbar puncture, purgation, stomach-washing, intestinal irrigation, hot baths, and the hot pack. These can hardly be described as surgical methods, and yet they are not medical in the strict sense of the word; the term physical is perhaps the most nearly

correct which can be given to them. Venesection, after having been out of favour for many years, is now frequently used: and the reports given by Macé and Chirié encourage the withdrawal of very large quantities of blood (from 1000 to 1500 grms.). These authors state that such large blood losses cause only a transitory anemia, do not predispose to infection, and are not dangerous in eclampsia. There is a tendency at the present time to limit the use of saline solution subcutaneously, for it is thought that it may do harm by raising the blood-pressure, and that the chloride in it may increase the amount of oedema. For these reasons some obstetricians have used sugar solution instead of salt. At the same time many patients do very well with the saline, especially when it is transfused intravenously after a preliminary bleeding. Thus W. Mortimer Brown (*Amer. Journ. Obstet.*, June 1912, p. 980) records a case of eclampsia treated with the hot pack, magnesium sulphate by the mouth, and the tincture of veratrum viride subcutaneously. The blood-pressure fell to 85 and another convulsion occurred; she was bled to the extent of 2 ounces, and 30 ounces of warm saline were run into the vein, with the result that the blood-pressure rose to 118, consciousness returned, and a good recovery was made. Lumbar puncture cannot be described as a successful means of treatment, but it has a value in prognosis, for if the cerebro-spinal is under high pressure the case is a grave one, and if it contain blood it is almost certainly fatal.

This summary has been restricted to the medical treatment of eclampsia; but one must not forget that obstetrical and surgical measures are much used by certain obstetricians. There can, however, be little doubt that a steady improvement in the results obtained by purely medical measures (such as we may reasonably hope for) would soon deter medical men from employing forced delivery, renal decapsulation, and the like.

THERAPEUTICS.

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THE TREATMENT OF PAROXYSMAL TACHYCARDIA.

RUDOLPH KAUFMANN (*Wien. klin. Wochenschr.*, No. 28, 1912) has carefully studied the action of physostigmine in a few cases of paroxysmal tachycardia. Although the instigation to this study was in fact partly accidental, it should occasion some surprise that investigation of this subject has not already been made. The case which by chance inaugurated Kaufmann's research was one of post-operative

meteorism, in which tachycardia and low blood-pressure were prominent features. The meteorism for which physostigmine was given was reduced but slightly—so slightly that Kaufmann was disposed to consider the relatively much greater improvement of pulse-rate and pulse tension as a primary action of the physostigmine. Further, in accordance with this view was the fact that the alimentary symptoms were in some respects made worse. Difficulty in swallowing set in simultaneously with pulse improvement. There was a sensation that food, even fluids, were retained somewhere at the level of the upper half of the cardiac region owing to œsophageal spasm. He regarded these as signs of a co-ordinate physostigmine action on the vagus. [It might here be noted that Winterberg, Loewi, and Mansfield have shown that physostigmine stimulates the vagus nerve-endings.] Following upon this observation Kaufmann studied the action of physostigmine in cases of long-standing paroxysmal tachycardia. He administered physostigmine alone, and also in combination with digitalis and strophanthus. The object of the combined administration was to ascertain whether the stimulating action of strophanthus and digitalis on the vagus can be increased by the sensitising action of physostigmine on the vagus endings.

Some of the cases treated were examples of atrio-ventricular tachycardia, and a considerable part of Kaufmann's paper is concerned with a minute study of cardiac, radial artery, and jugular vein tracings, necessary for the elucidation of the action of physostigmine. Kaufmann regards this procedure as a desirable preliminary to the therapeutic administration of the drug, for reasons which will be given hereafter.

It is not needful to refer at length to the details of Kaufmann's experiments, except to say that the exact diagnosis was established, and the effect of the treatment shown graphically by a Jaquet's kymograph. Many interesting curves are reproduced to illustrate the main points of the contribution, which, at least in the clinical therapeutic sense, breaks entirely new ground. The results obtained are briefly as follows:—In three cases of the atrio-ventricular form of tachycardia, physostigmine gave most satisfactory results after all other forms of treatment had completely failed. Of the latter, digitalis, digalen, strophanthus, morphine, opium, rest in bed, ice applications, and others are mentioned in the case reports.

In one case of the auricular form of tachycardia, and in one of the ventricular form, physostigmine had no apparent effect. Kaufmann has also tried physostigmine in numerous other cases of tachycardia, in such varieties as arrhythmia perpetua, the tachycardia of exophthalmic goitre, and in the reflex form, with the following results:—In several cases of exophthalmic goitre small doses were ineffectual, and larger doses (over $1\frac{1}{2}$ mgrms. by the mouth) have not yet been tried. This finding corresponds with that of the writer, who has used pilocarpine.

In two cases of reflex tachycardia Kaufmann has experience of a satisfactory kind with physostigmine. One of these cases has already been mentioned in the introduction to this abstract. In the second case digalen treatment completely failed to reduce the pulse frequency after large doses (45 drops daily, injection of 2 c.cm. daily), while the administration of 3 mgrms. physostigmine, combined with three digipuratum tablets, reduced the frequency from 130 to 80 within 24 hours. After the further administration of two tablets and one mgrm. of physostigmine the rate was reduced to 56. Treatment was then stopped, and the pulse rose immediately to 108. The cessation of treatment was partly for experimental reasons, but also because of the possible risk of pushing physostigmine after obtaining so decided an action as the above figures indicate. Eight days later the administration of two tablets of digipuratum had no effect on the pulse-rate. Kaufmann mentions this case as an example of others for which he regards the combined treatment as of the very highest value—*lebensrettend*.

In cases of arrhythmia perpetua he has never seen any important effect from treatment by physostigmine alone. The results obtained were merely such as are observed after the patient has rested in bed and has otherwise been removed from harmful influences. In this class of case he has also used the combined treatment above referred to, but is unable to say whether it has any advantage over treatment by digitalis alone. Some of his observations indicate, however, that a good result is more quickly and fully attained.

The number of observations made do not afford a basis for determining absolutely which cases are most suitable for physostigmine treatment. On the other hand, those treated with satisfactory results are all of a certain type.

So far as can be said at present, physostigmine is effective only in cases in which by vagus stimulation a diminution of the pulse frequency can be expected. This statement applies above all to cases of the atrio-ventricular type of paroxysmal tachycardia. Hering, Rothberger, and Winterberg have produced a similar condition in animals by paralysing the vagus with atropine and stimulating the accelerator. By stimulating the vagus Lewis was able to inhibit the experimentally-produced atrio-ventricular tachycardia, and the clinical form has been suppressed by pressure-stimulation of the vagus (Belski and Hering). Kaufmann's observations on the treatment of atrio-ventricular tachycardia by physostigmine are nearly analogous to those experimental observations.

The pathogenesis of peritoneal tachycardia is sufficiently obvious to permit some explanation of the beneficial action of physostigmine. When vascular paralysis of the peritoneal area occurs, blood-pressure falls, with consequent lessening of vagus tone and increase of pulse

frequency. Physostigmine, by stimulating the vagus nerve-endings, renders them more sensitive to the action of digitalis. It is thus theoretically suited to counteract the reduction of vagus tone occurring in cases of peritoneal tachycardia. As to the dosage, Kaufmann gave 3 mgrms. subcutaneously in the course of twelve hours in the first case. In another he gave by the mouth three minims thrice daily of physostigmine salicylate (1:1000) 0.5 mgrm. The dose was gradually increased to 1.5 mgrms. daily. By this method of administration Kaufmann observes that the symptoms slowly but definitely improved. Thus on 22nd January there were 16 attacks, lasting for 128 minutes. On 23rd treatment was begun in the form just described. On 31st January there were 4 attacks, lasting for 4 minutes. Thereafter, until 11th February, with the exception of a few slight symptoms, partly owing to the excitement arising from clinical demonstration, there were no attacks of tachycardia. On 11th February the patient went home on his own request. He was advised to continue the treatment, and did so for weeks with interruptions. No disagreeable by-effects occurred, but when the treatment was stopped for a time the patient returned to hospital for a renewal of his prescription to obtain relief from slight attacks. He reports this year that no attacks have occurred "*seit langer Zeit*." Single doses of 10 minims 1:1000 were given with digalen in another case. Digalen, morphine, and bromide had previously been given without effect. When physostigmine was given the pulse dropped from 200-208 to 100-108 and on the following day to 77-80. The further course of this case is somewhat similar to the one already described. During one of the attacks a dose of $\frac{1}{2}$ mgrm. was given subcutaneously with prompt relief. Instances are given of cases (not atrio-ventricular) which responded to comparatively small doses of physostigmine in the course of digitalis treatment which was previously ineffective. The combination is thus a form of treatment which promises to be a valuable addition to our resources in the management of several refractory types of tachycardia, and perhaps especially the atrio-ventricular type.

DIET IN DIABETES.

That carbohydrates of all foods influence glycosuria most unfavourably is known. That this law does not obtain for all diabetics without exception has been proved by recent observations. Thus, while most diabetics are in the first instance susceptible to carbohydrates, others, on the contrary, are chiefly susceptible to albumin. In such cases albuminous foods increase the glycosuria more readily and more decidedly than do carbohydrates. According to von Noorden's observations, the starch of oats is least harmful, and some very careful experimental work has recently been done which points to the correctness of von Noorden's supposition. That "oatmeal days" are helpful in some

cases is proved, but there seems no certain guide as to the class of case for which this treatment should be advised. Martin Kaufmann (*Zentralbl. f. d. ges. Ther.*, Hefte 5 u. 6, 1912), while approving of it, regards it as unsuited for use in general practice. He mentions that 60 grms. of a single carbohydrate are better borne than 30 grms. each of two varieties. Diabetics used to be told to take freely of meat, eggs, and cheese, in order to atone for the restriction or withdrawal of carbohydrate foods from the dietary. In uncomplicated cases this was the customary prescription. In cases complicated by gout or chronic nephritis, necessitating a restriction of red meat, it seemed impossible to bring the conflicting requirements into concord. This difficulty no longer exists, for a diabetic needs no more protein than the normal man. On the contrary, there are many cases in which it is only by limiting the amount of albumin ingested that the urine can be rendered free of sugar. Indeed there are some cases, especially grave ones, that are more susceptible to albumin than to carbohydrates. It has also been shown that a known quantity of any one of the albumins increases the urinary sugar less than a similar quantity of mixed albumins. In any circumstances it is now inadvisable to order large quantities of albumin, and this rule is especially to be regarded in the serious cases. The idea of compensating for restriction of carbohydrates by giving larger quantities of albumin should be abandoned.

CEREBRAL HYPEREMIA.

W. Ivanoff (*Zentralbl. f. d. ges. Ther.*, Hefte 4, 1912) recommends continued cold applications to the head for the treatment of symptoms arising from hyperemia of the brain. Vasomotor disturbances of purely functional nature, congestion due to mechanical obstruction in the veins, and polycythemia, are three clinical types of cases to which this form of treatment is suited. Ivanoff uses a cap fitting closely to the head, for such patients are seldom so ill as to be confined to bed. The ordinary ice bag is therefore impracticable. The cap is made of wool or several layers of linen, and is worn constantly. Patients are directed to dip the cap in cold water, wring it lightly, and wear it till it begins to become warm. The process is repeated, and so the cap may be worn throughout the day. Female patients are directed to wear either pergament paper or very thin oilskin under the cap, in order to keep the hair dry. In some cases it is necessary to wet only a section of the cap. As a method of treatment it has the advantage of wasting no time, and it might conceivably be used in some cases while the patient continues his daily work. Ivanoff has in this manner treated many patients at the polyclinic and in hospital with very good results. The patients have almost entirely been cases of functional disturbances. As a means of symptomatic treatment based on practical experience in Geh. Professor Briger's University Clinic, Berlin, it seems worthy of trial on suitable cases not yielding to other methods of treatment.

OPHTHALMOLOGY.

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VACCINE THERAPY IN EYE DISEASE.

MR. C. W. G. BRYAN, F.R.C.S.(Eng.) (*The Ophthalmoscope*, December 1911), in dealing with the subject of vaccine therapy in eye disease in a lecture delivered at the University of Oxford connected with the course for the diploma in ophthalmology, discussed at the outset the general treatment of disease by vaccines and later the results obtained by the use of this form of treatment in diseases of the eye.

Vaccine therapy, he pointed out, concerns itself with the production of active immunity against bacterial disease. Active immunity can be acquired in two ways—(1) by auto-inoculation by bacterial substances set free from some focus of disease; (2) by the methods of hetero-inoculation, where a vaccine is prepared and administered to the diseased subject, usually being injected subcutaneously.

Auto-inoculation is produced by disturbing the diseased area in some way, that is, by massage, movement, heat, etc.—an unsatisfactory method of producing immunity in diseases of the eye, owing to the limited blood and lymph supply.

In using vaccine it is necessary to prevent auto-inoculation by keeping the diseased part at rest, for if auto-inoculation takes place, bacterial substances of unknown amount may be set free in the bloodstream at unfavourable times, causing a variation of the dose of vaccine administered.

According to the dose of vaccine administered, four main effects can be produced, as shown by opsonic index curves:—

(1) If a small dose of vaccine be given, no effect on the index may be produced, although even in this case clinical benefit may result. (2) A dose which has only slight effect causes changes in the amount of opsonin in the blood—first, a rapid slight rise of the opsonic index, to be followed by a gradual fall to about the level at which it stood before inoculation. This is known as a “positive phase.” (3) The usual effect aimed at is the production, first of a “negative phase,” that is, a fall of the opsonic index immediately following the inoculation. This should not last longer than about thirty-six hours, and should be succeeded by a “positive phase” of comparatively long duration. (4) If an overdose be given, a negative phase only may be produced, causing harm to the patient, and possibly lasting for several weeks. In treating acute disease we attempt, by giving small doses at short intervals, to produce only positive phases; but in chronic disease more

benefit will result from the longer positive phase which follows a dose of vaccine which is large enough to produce a temporary negative phase—in fact it is our aim to produce, by repeated injections, negative phases as short as possible, followed by positive phases as long as possible. As the negative phase passes off, the injection is repeated. In treatment of a disease for any length of time it is necessary to increase the dose of vaccine very gradually. The size of the dose and the length of the interval between successive inoculations vary with the nature of the disease and its bacteriology.

It has been found that clinical symptoms closely follow variations in the opsonic index, and in eye disease local signs and symptoms are especially valuable. On the whole, larger doses of vaccine are necessary in the treatment of intrinsic disease of the eye than are used in infections of other parts of the body, and there is less danger from the production of negative phases.

A case is cited of tuberculous conjunctivitis which made a good recovery following tuberculin treatment over an extended period. An initial dose of $\frac{1}{50000}$ mgrm. was given, and the dose was gradually increased to $\frac{1}{20000}$ mgrm. Another case of interstitial keratitis cleared with similar treatment after a period of five months. Some twenty cases of phlyctenular ophthalmia have been treated with tuberculin. An initial dose of $\frac{1}{50000}$ to $\frac{1}{100000}$ mgrm. was given. After a few doses the eyes became quiet. Errors of refraction in these cases must also be corrected.

Internal tuberculosis, either with localised lesions affecting various parts, usually iris or choroid, or with generalised disease involving the iris, ciliary body, and choroid, require larger doses, and some excellent results have been obtained. The comparatively bad prognosis in these cases, and the necessity for very prolonged treatment by large doses of tuberculin, are due to the fact that the circulation of the internal parts of the eye is poor.

In most cases of disease due to pyogenic organisms it is possible and advisable to use a specific vaccine obtained from the diseased focus, but in diseases due to the staphylococcus a stock vaccine is perfectly efficient in nearly all cases. In diseases of gonococcal origin, too, a stock vaccine must usually be used, owing to the difficulty of preparing a specific vaccine and to the usually acute course of the disease. In these cases a stock vaccine gives quite satisfactory results. A striking benefit has been obtained in gonococcal ophthalmia by small doses of vaccine, repeated every forty-eight hours.

External Injections.—Acute inflammations of the lacrimal sac are usually due to streptococci, and are but little influenced by vaccine.

A case of chronic lacrimal sac inflammation due to pneumococcus was treated over a period of three months with vaccine, and cleared sufficiently to allow cataract extraction.

Vaccine treatment has given excellent results in chronic blepharitis, recurrent chalazions, hordeola, and a variety of recurrent conjunctivitis due to chronic inflammation of the Meibomian glands.

In corneal ulcers due to pneumococcus, success depends upon early treatment. Twenty-five millions of stock polyvalent vaccine should be given, and a specific vaccine prepared as rapidly as possible. Fifteen millions of this may then be injected, and the dose repeated in three days or so, the treatment being regulated by estimations of the opsonic index and by clinical appearances.

Cases of post-operative infection, rarely seen now, are eminently suited to vaccine treatment, and many eyes have been saved by this means.

NEW BOOKS.

The Skiagraphy of the Accessory Nasal Sinuses. By A. LOGAN TURNER, M.D., and W. G. PORTER, M.B. Edinburgh: William Green & Sons. 1912. Price 10s. 6d. net.

THE volume before us is the outcome of four years' practical experience with the use of X-rays as a routine method of examination in cases of disease of the nasal accessory sinuses. Following an interesting historical survey of the subject a section is devoted to the special forms of apparatus employed and to technique. Many practical points will be found thoroughly discussed, while a detailed reference is made to Pfeiffer's method of producing "vertex pictures" of the sphenoidal sinuses.

In order to interpret the skiagram accurately the authors give many useful hints, and illustrate their remarks by reference to excellent photographs of negatives, some provided with outline "keys."

The development of the sinuses and their anatomical relations to surrounding structures are admirably described. To clinicians the section devoted to "the diagnostic value of skiagraphy in inflammation and suppuration in the sinuses" will prove of special value.

The conclusions arrived at by the authors will be found to be tempered with moderation. While admitting that skiagraphy of the nasal accessory sinuses is of undoubted value in the detection of disease, they do not regard it as a perfectly reliable aid, and insist upon the employment of other and more ordinary methods of clinical diagnosis in addition to photography.

A careful study of the book will well repay the reader. The authors are to be heartily congratulated upon the production of a

thoroughly practical and useful volume, and the publishers upon the excellence of their work.

In a future edition we should hope to see more attention paid to stereoscopic radiography.

The Care of the Skin in Health. By W. ALLAN JAMIESON, M.D., F.R.C.P.E. Pp. 109. London: Henry Frowde and Hodder & Stoughton. 1912. Price 2s. 6d.

DR. ALLAN JAMIESON'S little book on *The Care of the Skin in Health*, though intended, we take it, primarily for intelligent laymen, contains a great deal of useful information for medical men, especially in the chapter dealing with the bath, the hair and nails, and clothing and diet.

Dr. Jamieson is a whole-hearted advocate of the bath, but he thinks most of us use too much soap, and he puts in a special plea for the helpless infant, who "is unmercifully dealt with in the matter of washing." The temperature of the morning bath should range from 56 to 80°, according to the age and vigour of the individual. A lot of harm is done by too cold baths to the old, the weakly, and the very young. Washing in the bath should be done with a loofah and without soap, and the bath should be followed by auto-massage. Warm baths should not be indulged in habitually, and hot ones should only be taken under medical advice. Frequent shampoos are required for the scalp, especially if the hair is long and is not washed every day. In Dr. Jamieson's opinion the best cleanser is a fluid extract of quillaja. While expressing a guarded opinion about adult "hatless brigades," Dr. Jamieson denounces the custom of sending babies out in their perambulators bareheaded as "senseless and harmful."

The chapter on diet is interesting—porridge is vindicated and tea condemned. Considerable space is devoted to the methods of preparing and using lactated milk, the merits of which Dr. Jamieson warmly advocates.

The book is written in Dr. Jamieson's customary clean English, and every one who reads it will learn something from it.

The Blood: A Guide to its Examination, and to the Diagnosis and Treatment of its Diseases. By G. LOVELL GULLAND, M.D., F.R.C.P.(Edin.), and ALEXANDER GOODALL, M.D., F.R.C.P.(Edin.). Pp. xiv. + 344. Edinburgh: William Green & Sons. 1912. Price 15s. net.

THE scope of this book is somewhat wider than its title implies, for it includes not only a description of diseases of the blood, but chapters on the symptomatic changes in the blood in general and local diseases,

and also an account of the various tropical diseases due to blood parasites. It is thus a very complete guide to the subject. Haematology is in itself a most fascinating clinical study, but works on haematology are often heavy, not to say dull, reading: it is not the least attractive feature of this volume, however, that it is written in an interesting readable manner. This arises from the fact that not only have both its authors already done a great deal of pioneer work in connection with blood diseases, but also they have had a large experience in teaching, and have thus learned the art of stating issues concisely, and not overburdening the reader with more or less relevant histological details and disputable theories. In short, the book gives a plain-sailing straightforward account of diseases of the blood, and in doing so it bears abundant witness to the adage that easy writing means hard thinking. The principal methods of examination are given in considerable detail, and references to original papers on less important points are furnished. The chapters on the histology and development of the blood are lucidly written, and the view taken of the relations of the lymphocyte group of cells is at once simple and capable of affording a logical interpretation of the changes the blood undergoes in disease. In their descriptions of the various blood diseases the writers rely to a great extent on their own clinical experience and pathological observations, and while referring adequately to the views of others, do not hesitate to state their own opinions on disputed points. An especially valuable feature of the book is the attention paid to treatment. In this respect the volume is quite unrivalled among its kindred, and few will consult it without obtaining some help.

Dr. Gulland and Dr. Goodall are most cordially to be congratulated on their book, which is both an important contribution to clinical haematology and a work which will be useful to practitioners. There are a number of admirably executed coloured illustrations showing the appearances of the blood in health and disease.

Post-mortems and Morbid Anatomy. By THEODORE SHENNAN, M.D., F.R.C.S., Edin., Pathologist to the Edinburgh Royal Infirmary, etc. London: Constable & Co. Price 18s.

IN these days of rapid development of pathological science there has been a tendency to overlook the fundamental position occupied by pathological anatomy in relation to clinical medicine and surgery. The appearance of the present volume is accordingly very opportune. It is the outcome of the writer's careful work in the post-mortem theatre for many years, and is the most important publication on the subject in this country within recent times.

The introductory chapters contain an account of the methods

followed in performing post-mortem examinations and the various points to be attended to in the external and internal inspection of the body. This has been done with great care and attention to detail, and is clearly the outcome of the author's own experience. In fact we may say that a strong personal note is evident throughout the work. Certain methods have come to be a sort of tradition of the Edinburgh school, and these have been largely adopted by the writer, but at the same time numerous modifications and additions will be found. Following upon this introductory matter, the pathological anatomy of the various organs is treated seriatim in chapters. In connection with each organ a preliminary account of methods of detailed examination, measurements, etc., and a general consideration of the pathological appearances and their significance are given, and then the individual lesions of the organ are described. This method appears to us an excellent one, as the student is first instructed in general principles and then led on to their application. As an illustration one might refer to the general account of the morbid anatomy of the kidney, which will undoubtedly simplify the somewhat difficult subject which follows. The lesions of each organ are treated in a comprehensive manner, and the descriptions are concise, faithful, and readily followed. An excellent chapter on post-mortem changes produced by poisons concludes the systematic part of the work. There is, however, a valuable appendix, in which the chief methods of preserving specimens, of histological examination, etc., are given: this will be found to be very helpful, as it is practically a concise summary of what the writer has found to be most useful. There is also a good bibliography, wisely restricted to recent publications. The chief morbid lesions are illustrated by about two hundred photographs: these are, as a rule, excellent, but some have apparently suffered in the reproduction, the high lights being not so clear as one would have wished.

As the work essentially deals with naked-eye pathology, histology is of course not fully treated of, but short histological descriptions, especially when these are required for the interpretation of the naked-eye appearances, are given. Accordingly one finds a considerable amount of useful histology supplied in this way. The nature of the book being essentially descriptive, one does not look for much discussion of controversial points, and the author has as a rule preferred simply to give his own views with regard to such subjects. The apportioning of space in a work of this kind to the multiplicity of subjects is a matter of great difficulty, and though probably no two opinions would agree on such a matter, we consider that this has been judiciously done, and that the standard of excellence is maintained in a wonderfully uniform manner in the different chapters. We would have liked, however, to see the morbid anatomy of the appendix more fully dealt with. We can confidently recommend the work to students

and practitioners of medicine as one full of useful and reliable information, and at the same time thoroughly scientific as regards the manner of treatment.

Hypnosis and Suggestion: Their Nature, Action, Importance, and Position amongst Therapeutic Agents. By W. HILGER, M.D. (of Magdeburg). Translated by R. W. FELKIN, M.D., F.R.S.E. With an Introduction by Dr. VAN RENTERGHEM (Amsterdam), translated by A. NEWBOLD. Pp. 233. London: Rebman, Ltd. Price 10s. 6d. net.

EVERY medical man consciously or unconsciously makes use of suggestion in dealing with his patients, his tone, his bearing, his expression inspiring hope and confidence, or the reverse.

Suggestion as a definite therapeutic measure with a technique of its own has been used extensively by duly qualified men for a considerable time, especially on the Continents of Europe and America: in this country, however, with few exceptions the medical profession has been, if not antagonistic, at least quite apathetic towards it and that in spite of the brilliant results published.

Signs are now apparent that this attitude is undergoing a change, and the study of such a book as the volume before us should go a long way to popularise psychotherapeutics with medical men and eliminate a prejudice which is not creditable to a great profession.

The book is divided into four parts, with very full synopses at the beginning of each.

The first part deals with the nature and methods of hypnosis and suggestion, discusses sleep and dreams, and illustrates the "mental reflex," that is, a reflex brought about by some mental process.

The subject of the second part is suggestion and will, with special reference to general education and the formation of habit. Here may be found examples of treatment of alcoholism, morphinism, and obsessions. With reference to such cases Dr. Hilger observes: "When a specialist in nervous diseases sees that a patient has succumbed in the struggle against his desires, his bad habits, his morbid fears and anxieties, when he sees that strength is failing, then it is his duty to use those methods of cure which psychotherapeutics have put into his hands, if he would follow his calling to the full. Under these conditions medical aid will act beneficently—it will restore free will to the patient."

The third part treats of suggestion and the action of the will in connection with the psychology of sensation.

Part IV. is devoted to disturbances of the reflex activity and their treatment. Amongst the conditions treated successfully by hypnosis and suggestion are hiccough, vomiting, nervous diarrhoea, constipation,

enuresis, cardiac neuroses, asthma, sleeplessness, chlorosis, etc. Of chlorosis Hilger says: "By increasing the appetite, regulating the action of the bowels, overcoming the menstrual disturbances, nervous troubles, headaches, etc., we can, with hypnotic suggestion, fulfil nearly all the requirements which the disease demands of rational therapy." Such results may seem incredible to one unacquainted with psychotherapy, but the experience of others amply corroborates Dr. Hilger's words. Anyone who has practical knowledge of the power of suggestion in the region indicated will testify that his claims are in no way exaggerated. The value of the book is enhanced by the excellent introduction, in which Dr. Van Renterghem gives an able and well-balanced summary of the history of psychotherapy for the last sixty years, indicating the methods preferred by such men as Liébault, Charcot, Bernheim, Forel, Dubois, Breuer, and Freud.

Dr. Felkin is to be congratulated on the excellence of his translation.

Nephritis: An Experimental and Critical Study of its Nature, Cause, and the Principles of its Relief. By Dr. MARTIN H. FISCHER, Professor of Physiology in the University of Cincinnati. Pp. 203. New York: John Wiley & Sons. 1912. Price \$2.25.

THIS work is the Cartwright prize essay of the year 1911, and is not merely an interesting and suggestive contribution to the physiological chemistry of the renal secretions, but offers, as the result of the experimental deductions, a means of treating nephritis which appears to have already proved of therapeutic value.

The albuminuria in nephritis "need not come from the blood, but results whenever conditions are offered in the body which permit the solid colloidal membrane that separates the blood from the urine to go into solution in the urine." In nephritis, acids are produced which render this colloidal membrane soluble. In nephritis there is a production or accumulation of acid in the cells of the kidney, and in both the blood and the urine in nephritis there is a great increase in the true acidity. The writer proves each step in his theory by numerous experiments, and, in addition, demonstrates that the kidney substance, which in health is alkaline in reaction, becomes acid in nephritis. The injection of an acid into the kidney substance causes nephritis, with a resultant albuminuria, casts, and blood in the urine. Further, he has found that casts of almost all kinds may be obtained by placing slices of normal kidney in acid solutions for some hours.

Exercise may introduce this acid in excess. An abnormal acid production is the constant accompaniment of a state of lack of

oxygen in the tissues, no matter how produced, and hence the albuminurias due to certain poisons and morbid conditions. Albuminuria is a constant accompaniment of salt starvation, and the author attacks the treatment of nephritic dropsy by salt-free diet. Salts tend to prevent the colloids from going into solution where acids are abnormally present, or where the acid, like CO_2 , is normally produced in the tissues.

An account is given of a limited number of cases of nephritis treated by sodium carbonate (crystallised, 10-30 grms.), sodium chloride (14-20 grms.) in water (1000 c.c.), administered generally by the rectum by a continuous drip method, and in several cases intravenously. Where dried sodium carbonate is used, only one-third the amount of that salt is to be employed.

The book is well written, is most suggestive, and if treatment on the lines indicated proves equally efficacious in a larger number of cases in which the kidneys are capable of resuming their usual function, a most valuable addition has been made to our methods of relieving one of the most dangerous forms of disease with which the human race is afflicted.

Practical Anatomy: The Student's Dissecting Manual. By F. G. PARSONS, F.R.C.S.(Eng.), and WILLIAM WRIGHT, M.B., D.Sc., F.R.C.S.(Eng.). Vol. I. The Head and Neck; The Lower Extremity. Pp 467. 189 Figures. Vol. II. The Thorax; Abdomen; Pelvis; Upper Extremity. Pp. 382. 143 Figures. London: Edward Arnold. 1912. Price per volume, 8s. 6d. net.

THE intention of the authors to provide students with a manual free from unimportant detail is in the highest degree praiseworthy. Unfortunately opinions differ as to the relative importance of anatomical facts, and the authors have found it necessary to include information which they themselves would have preferred to omit. The general scheme of the work is admirable; description and instructions for dissecting are harmoniously blended, and there is no danger of the student's attention being occupied with the former at the expense of the latter. Care has been taken to emphasise facts of great surgical importance, the surgical application being indicated in many places.

It is a pity that in their desire for brevity the authors have omitted much information which is not without value. Such arteries as the deep epigastric, the abnormal obturator, and the lingual are of great practical importance, and might with advantage have been described in greater detail. Tradition has been carefully followed in the scantiness of the description accorded to the relations of the internal jugular vein, and one wonders why this important vessel

is so frequently neglected. A grave oversight—for it can scarcely have been left out intentionally—is the omission of all mention of the phrenic nerve in the description of the cervical plexus, and it is a little difficult to understand why the same nerve is not referred to in the paragraphs (vol. i. pp. 157 and 158) which deal with the anterior relations of the scalenus anticus.

The authors' views on fascial planes have the advantage of extreme simplicity, but in this respect a certain amount of inconsistency creeps into the work. The fascia covering the psoas muscle is accorded a fairly full description, but the prevertebral fascia, which is just as important surgically, is dismissed in a few words. On page 76, vol. ii., mention is made of a "strong layer of fascia . . . the posterior layer of Gerota's fascia," but neither there nor elsewhere is a description given of the extent and connections of this fascial sheet.

The procedure of placing the subject on its face for the first few days has been followed, although it involves the dissection of the posterior triangle of the neck from behind, whereas this region is almost invariably attacked by the surgeon from in front. A further disadvantage of this procedure is that the dissector of the upper extremity disturbs the posterior axillary wall before he studies the axilla. Experience shows that in each case the student is apt to receive an erroneous impression of a very important area. The sections which deal with the middle and internal ears are worthy of high praise, as the information included is all thoroughly practical and well illustrated.

The actions of muscles, when they are inserted, are given not as isolated facts but as logical deductions from the relations of the muscles to the joints over which they pass and from their bony attachments. It is not quite clear why this important part of the subject should receive much more attention in the upper than in the lower limb.

Both volumes are generously illustrated, but many of the figures, which are often novel in idea and highly illuminating, have lost in detail in the process of reproduction. The new nomenclature has not been adopted, but is inserted in brackets in many instances. One cannot help thinking that the inclusion of the exact Latin equivalent of the English name or phrase, e.g., "deep branch (*ramus profundus*)," is quite unnecessary and wastes valuable space.

Taken as a whole, the book offers to the student a readable and extremely practical dissecting manual. At the same time it is unlikely that he will be able to do without the assistance of one of the larger text-books to amplify and complete his knowledge.

Foods: Their Origin, Composition, and Manufacture. By WILLIAM TIBBLES, M.D. (*Hon. Causa*), Chicago, I. R.C.P. (Edin.), M.R.C.S. Pp. viii. + 950. London: Baillière, Tindall & Cox. 1912. Price 18s. net

ALTHOUGH this book deals with an aspect of the subject of food which does not so closely touch a doctor's work as does dietetics in the narrower sense, much of the information contained in it will prove of interest to practitioners as well as to the public health officials, for whom it is more especially intended. Popular crazes about food recur with seasonal regularity, and the doctor is the first person asked what truth there is, for example, in the vaunted merit of "standard bread." Dr. Tibbles' book contains the sort of facts on which an intelligent judgment on such questions can be formed, and it also yields much that is of interest in the ordinary domestic economy of the household. There are two introductory chapters on organic chemistry and metabolism: both are excellent synopsis of their subjects so far as they bear on food. The rest of the book is occupied with a description of the various aliments, from roast beef and beer to ratafias and fruit syrup, considered from the point of view of chemistry, nutritive value, commerce, and legislation. The subject is so vast that it can only be dealt with by compiling, and Dr. Tibbles has woven information from innumerable sources into a coherent whole. This has, he says, been a "pleasure and source of delight," and probably this spirit has contributed not a little to the success of the result. We regard Dr. Tibbles' book as likely to rank among the best and most comprehensive authorities on its subject.

NEW EDITIONS.

Text-Book of Microscopic Anatomy. By E. A. SCHAFER, LL.D., Sc.D., M.D., F.R.S. Vol II. Part I. *Quain's Elements of Anatomy.* Eleventh Edition. With 1001 Engravings and 21 Coloured Plates. Pp. 739. London: Longmans, Green & Co. 1912. Price 25s.

MANY years have elapsed since the tenth edition of *Quain's Anatomy* was issued, and a new edition of the histological portion was much needed. Part I. of the second volume of the eleventh edition is wholly devoted to a description of microscopic anatomy, and includes material which in previous editions was distributed in separate volumes. In itself this volume is a complete text-book of histology, and as such is a great advance upon anything of the kind hitherto published in

the English language. The volume is a large one, but some of its increase in bulk is accounted for by the large number of illustrations and lithographic plates.

The subject-matter has been rearranged and rewritten. A full and concise description of each tissue and organ is given, and the reader who wishes further information on any point is provided for by frequent footnotes, in which recent or important papers, and any special information to be obtained in them, are recorded. Papers giving a résumé of literature on the subject are specially noted. The work will therefore be a boon to workers in histology and pathological anatomy.

A chapter on the structure of the vascular system is by Professor Gustav Mann of Tulane University, New Orleans, but the volume is edited, and the greater portion of it written, by Professor Schäfer.

The illustrations are very plentiful, well chosen, and excellently reproduced. Special praise must be given to the coloured plates, and to the faithful manner in which they portray actual specimens. No description of multipolar nerve cells, and of the changes they undergo in chromatolysis, could be so vividly conveyed to the mind as is presented by the coloured plate facing page 212. The same may be said of practically all the illustrations—they are true representations of microscopic tissues: many indeed are micro-photographs, and not a few of them and of the coloured plates are the work of Mr. Richard Muir.

The new edition gives us a complete and authoritative work of reference on histology, which will be universally welcomed and appreciated.

A Short Practice of Medicine. By ROBERT A. FLEMING, Lecturer on Practice of Medicine in the Edinburgh Medical School. Second Edition. London: J. & A. Churchill. 1912. Price 12s. 6d. net.

In this book on medicine the student and general practitioner will find a clear concise account of practically all known diseases. Each disease is methodically described, and just enough description is given to enable the student to gain a correct idea of it without being confused by too many details—these he will get from his teachers and from books written about special diseases. The newest information has been carefully sifted and incorporated in the book, and the author has wisely avoided the use of sesquipedalian terms, which irritate without instructing the student. The book is beautifully printed. It is a right good short practice of medicine.

Clinical Methods. By ROBERT HUTCHISON, M.D., F.R.C.P., and HARRY RAINY, M.D., F.R.C.P.(Edin.), F.R.S.E. Fifth Edition. Pp. 656. With 159 Illustrations. London: Cassell & Co., Ltd. 1912. Price 10s. 6d.

THIS guide to clinical medicine is so well known and so highly esteemed that it is only necessary for us to chronicle the appearance of a new edition. The authors have taken this opportunity of carrying out a thorough revisal of the whole work, and where recent advances could only be incorporated by rewriting whole sections, this has been done. The illustrations have been improved and the index amplified. We know of no better guide to the student of clinical medicine.

A System of Clinical Medicine. By THOMAS DIXON SAVILL, M.D. Third Edition. London: Edward Arnold. 1912. Price 25s.

THE fact that a new edition of this well-known work has been called for within three years of the publication of the second edition proves that the book is supplying a felt want. The present edition is edited by Dr. Agnes F. Savill. She has been assisted by Dr. F. Ford Caiger, Dr. F. M. Sandwith, Dr. Leonard Williams, Dr. Angus MacGillivray, Dr. Elizabeth Fraser, Dr. R. H. Cole, and Dr. Gordon R. Ward, who are responsible for the revision of the chapters respectively on fevers, tropical fevers, diseases of the thyroid, diseases of the eyes, immunity and bacteriology, insanity, and diseases of the blood. The arrangement and the scheme of the volume remain the same as in former editions. The work has been thoroughly revised, and as far as it is possible in a rapidly advancing science brought up to date. Much new matter has been added in all the sections without increasing the size of the volume. One of the least satisfactory chapters is that dealing with the circulatory system, which has hardly received the revision which recent advances in the subject merit. On the whole, however, the revision has been thoroughly and judiciously done, and the third edition well maintains the high standard of its predecessors. We confidently recommend it to students and practitioners alike as a useful and reliable guide to the study of clinical medicine.

Anæsthetics. A Practical Handbook. By J. BLUMFELD, M.D. Third Edition. Pp. 134. London: Baillière, Tindall & Cox. 1912.

THIS book is intended for the student preparing for his final examination, and is therefore severely condensed. The instructions for the administration of the various anæsthetic drugs are clear and succinct, and the methods chosen for full description are those which can readily be learnt by the beginner, while the more advanced methods are briefly

mentioned. Spinal, intravenous, and local anaesthesia are described in sufficient detail for the purposes of the student, but hardly so for those of the junior practitioner who might wish to carry out either the spinal or the intravenous methods without supervision for the first time. One cannot but think also that the value of the book would be enhanced if such subjects as the pharmacological action of the various anaesthetics and the pathology of shock and of post-operative acidosis received a fuller treatment. But as a practical guide to the student the work well deserves the success to which the appearance of a third edition bears testimony.

NOTES ON BOOKS.

IN *Heart Sounds and Murmurs: Their Causation and Recognition* (H. K. Lewis, 1911, 2s. 6d. net), Dr. E. M. Brockbank, M.D., F.R.C.P., describes very concisely the normal sounds of the heart and the modifications that they undergo in disease. Both the text and the illustrations render it a useful book for students.

The fundamental and elementary facts regarding the disturbances of the heart's mechanism are described by Dr. Thomas Lewis in *Clinical Disorders of the Heart Beat* (Shaw & Sons, 1912). The book is intended for the busy practitioner, and accordingly the author states his facts in dogmatic fashion, without reference to the evidence on which they rest. The text is illustrated by 48 simple illustrations— tracings and diagrams—and the whole may be cordially recommended to the notice of students and practitioners.

In the third edition of *Bronchial Asthma: Its Pathology and Treatment* (Henry Frowde, 1911, price 5s. net), Dr. Berkhart expounds his opinion that bronchial asthma arises from a transient obstruction of the bronchi and not from bronchial spasm of nervous origin. The treatment of asthmatic patients is described in some detail.

New methods and tests have been incorporated by Dr. Herbert French in the third edition of *Medical Laboratory Methods and Tests* (Baillière, Tindall & Cox, 1912, price 5s. net), which contains most of the information that a student working in a small clinical laboratory is likely to want. The book is bound in soft leather, and is of convenient size for the pocket.

EDINBURGH MEDICAL JOURNAL.

EDITORIAL NOTES.

Honour to Sir William
Turner..

WE offer our congratulations to Principal Sir William Turner on the signal honour paid him by His Majesty the Emperor of Germany, who has been pleased to confer on him the Insignia of Knight of the Royal Prussian Order Pour le Mérite in the Department of Science, in recognition of his eminence as an anatomist. If anything could enhance the distinction of this compliment it would be the fact that Sir William has been selected to fill the vacancy in the Order caused by the death of Lord Lister.

The Position of Pathology
and Clinical Medicine
in Edinburgh.

MR. FLEXNER'S Report on Medical Education in Europe has attracted a great deal of attention in Scotland, and no part of it more, perhaps, than the strictures on pathological teaching in Edinburgh. The publicity given to his criticisms by quotations in the local press was in some ways regrettable, if only for the reason that at the time of their appearance the report itself was not generally procurable on this side of the Atlantic. Now to appraise these criticisms at their proper value it is necessary to consider the report as a whole, to realise its frankly pedagogic outlook, and also to compare the strictures on the different schools. To publish the criticisms about Edinburgh alone was scarcely fair to its teachers, and was not, in fact, calculated to do any real good, because all interested in the subject knew the weak points perfectly well, knew their causes, and knew the difficulties in the way of remedying them.

By the resignation of Professor Greenfield the University has lost the services of a leading clinician and one of the most distinguished pathologists of his generation. At the time of his election to the chair it was within the power of one man to teach pathology, bacteriology, and clinical medicine with acceptance. Nothing measures so well the growth of these subjects during a quarter of a century as the fact that the University has now to appoint three men at least to do the work of the recent incumbent of the chair. It is this enormous and rapid specialisation of pathology and bacteriology that is the primary cause of the inadequacy of the existing arrangements.

As regards bacteriology, the University is fortunately circumstanced. It has the money, and only waits the lapse of time required by formalities to be able to found a chair of bacteriology.

Pathology unquestionably presents many difficulties—all summed up in the words "Institute of Pathology." Until a real institute

of pathology within, or at least partly within, the confines of the Royal Infirmary is established, with the University professor as its titular head, it will be impossible to place pathological teaching and research on a proper basis. Obvious as this is from the standpoint of the school, it must be remembered that the Managers of the Infirmary naturally and rightly look at it from another point of view: they are first of all trustees for the public of a great charity; their interest in the school, where not sentiment begotten of the long association between the two bodies, hinges solely on the benefit, direct or indirect, which the patients derive from clinical teaching and research. A pathological institute might mean spending money, and at a time when the future of hospitals as voluntary charities is in the balance, the Managers may deem it prudent to conserve their resources; they will not, at least, face outlays without good cause shown. It must be proved that a new departure of such magnitude is for the good of hospital as well as school. The answer, of course, is, that the fame of the Infirmary and the fortunes of its patients are indissolubly bound up with the efficiency of the medical school: if the latter declines, so do the former; let the school flourish and the sick poor benefit. The statement bears reiteration better than most platitudes, and it is especially necessary to urge it just now in view of the conflict in which our profession is engaged, and the distrust which that has, inevitably, engendered among thoughtless people. The Infirmary would be a gainer by having at its disposal all the resources of the University for diagnosis and treatment; the University would benefit equally from the increased facilities for teaching and research. Both would share in the advantage of a thoroughly equipped pathological institute, and the apportionment of expense between them ought to be no serious difficulty.

The Managers and the University are not, however, the only interested parties. The staff, including the pathological staff, have a very direct concern in future arrangements. The relation between pathologist and clinician as regards material is well defined by use and wont. The head of a pathological institute would assuredly have a stronger claim on material than under the existing system. Even though the two present departments were assimilated, the work to be done would not diminish (it ought to increase enormously), hence there need be no question of the supersession of the Infirmary pathological staff. They would receive the undeniable benefit of a more or less close connection with the University—moral support as well as material backing. Combination, or even complete fusion, of the two staffs would make for economy of labour, and work could be so distributed as to leave more time for individual research. Details such as these constitute difficulties, but it is certain that if they are carefully thought out they can all be arranged satisfactorily.

The University has also to face the question of filling the vacancy

among its clinical teachers. So far as the students are concerned the matter is of no immediate urgency. Edinburgh has worked out its own salvation, and little serious criticism can be levelled at its clinical teaching pure and simple. But surely clinical medicine should now be placed on the same footing as pathology by the creation of a research department. The clinical laboratory in the Infirmary, equipped through private munificence, has already by its output of work shown us possibilities for the future. It is wholly admirable so far as it goes, but it merely adumbrates what ought to exist. The future of biological research lies in the hands of the chemist and the physicist as much as in the hands of the physiologist. Medicine, pathology, bacteriology are all turning to chemistry to solve their problems. Hitherto, for lack of workers and facilities, little or no work of this nature has been accomplished in Edinburgh. The requisite training is long and arduous, and at present there is no inducement for a young graduate to devote a year or two years to preliminary studies which he cannot bring to fruition at his own school. Yet from Edinburgh there came pioneer work on this line. The classical researches of Crum Brown and Fraser on the methylation of alkaloids afford the earliest and most striking example of chemical constitution influencing physiological action; and at a much later date Sir Thomas Fraser from the first insisted that the interaction of venom and antivenom was a chemical, not a biological, process. A plea, therefore, may be put forward for due recognition of chemistry in the clinical department to come.

Such a department would, of course, be a more or less integral part of the Infirmary, and would naturally come in touch with a pathological institute in many places. It would be an appropriate annexe of such an institute, a fact which ought to be borne in mind in planning the latter.

Whatever arrangements be made for clinical teaching in the immediate future, the question of creating a department of clinical medicine, aiming chiefly at research and the co-ordination of teaching rather than actual undergraduate instruction, under the professor of medicine or under a professor of clinical medicine, should the creation of such a chair be deemed advisable, is an urgent one.

Medical Officers of Health and Sanatorium Benefit. IN the interim Report of the Departmental Committee on Tuberculosis we read:—

(a) "The committee are of opinion that the tuberculosis dispensary should be the common centre for the diagnosis and for the organisation of treatment in each area.

(b) "The staff (*i.e.* of the dispensary) will include a whole-time chief tuberculosis officer, responsible for the general conduct and administration of the dispensary. He should be a first-rate clinician, with special training in tuberculosis.

(c) "The chief tuberculosis officer should be independent of control by any other medical man so far as his clinical duties are concerned,

and should, subject to his relationship to other officers as defined by the local authorities, be responsible for the management of these institutions. He should be in intimate relationship with the medical officer of health . . . in close touch with other authorities."

No suggestion is here made of employing the medical officer of health as chief tuberculosis officer. Recently the Local Government Board has authorised the temporary employment of medical officers of health in this capacity, but judging from the trend of advertisements in the medical journals and from information in the daily press, many of these officers apparently have every intention of occupying this position permanently. True, some of them are careful to say "chief tuberculosis officer for administrative purposes only," but others possessed of more assurance make no such reservation.

It must come as a revelation to many that the medical officer of health with his varied duties has leisure to add to them the work of administering a vast scheme such as that recommended by the Astor Committee. We can only conclude that the majority of medical officers of health fail to grasp the magnitude of the problem.

Should the medical officer of health succeed in annexing the post of chief tuberculosis officer, it will be fatal to the success of the scheme, which will only occupy a pigeon-hole in his desk along with other departments of his work. From the very nature of his office the medical officer of health is not a clinician, and is therefore not fitted to direct a scheme which requires a combination of clinical and administrative experience in tuberculosis.

Moreover, the direction of the tuberculosis scheme in an area will require the undivided time of a specially trained man. This man is specially enjoined to work in co-ordination with the medical officer of health in all matters of public health. But the organisation, administration, and working of the tuberculosis dispensary as the central unit of the scheme can only be effectively carried out by a trained expert, and this we frankly say the medical officer of health is not.

The function of the medical officer of health is to advise and assist the Insurance Committee, but not to be their executive officer; as guardian of the public health to investigate the domestic and sanitary conditions of all cases notified to him either by general practitioners or through the tuberculosis dispensary.

Appointments.

THE King has been pleased, on the recommendation of the Secretary for Scotland, to approve the appointment of W. R. G. McKerron to be Regius Professor of Midwifery and Diseases of Women and Children in the University of Aberdeen in the place of Professor W. Stephenson, who has resigned.

The Curators of Patronage have selected Professor J. Lorrain Smith to fill the chair of Pathology in the University of Edinburgh, rendered vacant by the resignation of Professor Greenfield.

ADDRESS ON THE PRESENCE AND PREVALENCE OF
TUBERCULOSIS IN CHILDHOOD.*

By R. W. PHILIP, M.D., F.R.C.P.,
Edinburgh.

IN acceding to the request of the Committee that I should say something introductory to a discussion regarding the occurrence and prevalence of tuberculosis in childhood, I shall endeavour to place before you very briefly one or two thoughts which I trust may prove suggestive.

The past thirty years have seen frequent changes of front towards the tuberculosis problem. None of these is of greater interest or fraught with more practical significance than that which has determined attention to the etiological relationships of childhood to tuberculosis. The older conception which centred thought on the period of adolescence and early adult life is giving place to the belief that the tuberculosis of these periods is, in greater part, the harvest of seed sown in childhood. If this be so, it is manifest that the most hopeful line to be prosecuted in relation to the prevention and eradication of tuberculosis is the study and detection of its earliest manifestations in the child.

If any lesson be written large as the result of the common failure in time past to treat the problem effectively, it is this, that we have looked in too exclusive a fashion at the completed picture of advanced visceral disease and have thought too little of the successive stages leading from inoculation slowly up to this. This is true of the successive stages of tuberculosis at all periods of life. It is especially true in relation to the progress of the infection in the developing child.

NATURAL HISTORY OF TUBERCULOSIS.

Tuberculosis is a process of sluggish, insidious spread. The actual point of inoculation may present little or no determinable change. The gradual extension by way of the lymphatic system has escaped notice for the most part. Observation has been drawn to this only when disfigurement has occurred through gross enlargement of one or other gland or group of glands, or when suppuration has supervened.

Take, for example, the frequent case when tuberculosis enters by way of the tonsils and adjacent glandular structures. The

* Delivered before the Tuberculosis Conference under the auspices of the National Association for the Prevention of Consumption of Great Britain, at Manchester, 5th June 1912.

subsequent passage of infection follows the line of the chain of lymphatic ducts and glands. The glands undergo a process of infiltration which involves individual glands successively from above downwards. Yet attention has been little directed to the glandular involvement, save in those instances where grosser enlargement of one or more has taken place, associated with caseation or suppuration. Under ordinary conditions for the most part, the less evident but uniform spread of infection from gland to gland is missed. It is the accidental determination of suppuration at one point which generally arouses attention. Yet, in the former case, a subtler, although less obvious, form of infection is in progress.

Whether inoculation has been effected in the tonsillar region or the intestine or at some other point of the mucous surface, the process of spread in the majority of cases is similar, namely, through the adjacent lymphatic system. Wherever it be, if the glandular change be relatively slight and correspondingly out of sight, the fact of inoculation is constantly overlooked until the advent of definite symptoms indicates that some organ of importance has been attacked.

In this sense a significant analogy may be traced between the natural history of tuberculosis and of syphilis. In both cases the initial phenomena of inoculation and early spread through the lymphatic system are similar. In each case the fact of inoculation may be missed until its presence becomes evidenced by grosser visceral disease.

WATCHFULNESS NEEDED.

I know no subject of greater interest than the observation of the changes which occur from week to week and month to month and year to year in the young child who has become infected by tuberculosis. I have watched them again and again from the stage of minor involvement of a few glands to that of disintegration of lung or other visceral tissue. My belief is that if child-life were watched with sufficient care and with sufficient suspicion in respect of tuberculosis, we should be in a position to anticipate and prevent most of the doleful harvest. If it be true, as I have no manner of doubt it is, that tuberculosis is much the commonest disease of child-life, there seems need of a more general awakening of suspicion as to its presence amid the varying symptoms of disease in childhood. And the need is no less for careful study, both clinical and pathological, of the course of tuberculosis in the child, so that mere suspicion may be changed into scientific diagnosis.

EVIDENCE AS TO PREVALENCE.

As to the immense prevalence of tuberculosis in childhood there can be no reasonable ground for doubt. Statistics on the point, based on exact observation—clinical, pathological, and experimental—have been forthcoming from many sides.

A. *Clinical Evidence*.—The clinical evidence is strong. There is a consensus of opinion that congenital tuberculosis is rare. Even with tuberculous parents the child is very seldom born with tuberculous disease. Whether the parents are tuberculous or healthy, the occurrence of tuberculosis in the child during the first six months of life is relatively infrequent. From that date onwards the frequency of tuberculosis increases steadily.

A number of years ago I submitted the statement, based on personal clinical examination of different groups of children of school age in Edinburgh, that at least 30 per cent. presented definite evidence of tuberculosis. With greater latitude in the interpretation of clinical signs, the percentage would have been considerably greater. Later observations on the same lines, combined with the use of the tuberculin test, have satisfied me that the figure I have quoted was within the truth.

The evidence obtained from the system of the "March-Past" of households, introduced by the Tuberculosis Dispensary, is striking. It is not uncommon to discover during one such examination signs of tuberculosis in three, four, or five children from the same house.

Since the introduction of the tuberculin cutaneous tests a considerable series of observations have been reported from different countries, which all tend to the same conclusion, namely, that tuberculosis exists, and can be determined individually, in the majority of school children.

The figures of von Pirquet, Ganghofer, Hamburger, Monti, Franz, and Calmette go to show that in their respective cities most children among the working-class population have been tuberculised by the time they reach the age of fifteen. Nor is the statement referable merely to the children of large cities. The observations of Franz included the examination of 400 young soldiers—apparently healthy recruits, who had passed the ordinary physical examination for the service—and among these he found that 61 per cent. gave a positive reaction to the tuberculin test.

B. *Pathological Evidence*.—The pathological evidence is no less clear. Twelve years ago Naegeli of Zürich reported that he had found definite signs of tuberculosis in no fewer than 97 per cent.

of all bodies examined consecutively by him post-mortem, *i.e.* of persons dying from different kinds of disease and accident. On such facts was based the well-known aphorism, "*Am Ende hat jedermann ein bißchen Tuberkulose*" (sooner or later everybody gets a touch of tuberculosis).

But the true inwardness of the observation was discovered only when more careful attention was directed to the post-mortem examination of children. Hamburger has reported the results in two separate groups. The first series included 401 children, of whom 63 per cent. of those between 7 and 10 years of age showed evidence of tuberculosis, and 70 per cent. of those between 11 and 14. The second series included 848 children. Of those between 7 and 10 years of age 63 per cent. were found to be tuberculous, and 70 per cent. of those between 11 and 14. Deducting from the 848 those who had actually died from tuberculous disease, it was determined that of the remainder between 11 and 14 years of age no fewer than 53 per cent. had tuberculous lesions. Of special interest is the fact that in this series the frequency of tuberculosis steadily increased from 17 per cent. in those of 2 years of age to 53 per cent. in those between 11 and 14.

It is a point of much significance that during recent years, with increased refinements of methods, the number of children found to be tuberculous on post-mortem examination has steadily grown.

C. *Experimental Evidence*.—Experimental research has shown that tuberculosis is of still more frequent occurrence than clinical and pathological observations have been able to determine. It has proved that various conditions in which it had not been possible to discover characteristic appearances either at the bedside or post-mortem table were nevertheless of tuberculous nature. This has been determined in the case of young children, in whom no definite tuberculous lesion could be discovered by the ordinary means in life or post-mortem, with the exception of multiple infiltration of cervical and other glands. From these glands—in the absence of microscopical appearances of tubercle—it has been found possible to prepare an extract which, when injected into guinea-pigs, has produced tuberculosis.

From all this it will be seen that we are confronted by the fact that tuberculosis is vastly common in childhood. Most children take it one time or another. The child's mucous membranes are specially receptive and absorbent. Inoculation occurs readily at any point. The extent of spread depends chiefly on the

child's vitality or the resistance offered to the invading organisms by its living cells. This, in turn, is influenced largely by the character of the child's compulsory environment.

Other things being equal, the younger the child the more easy seems the dissemination of the virus throughout the lymphatic system. The frequency of infection increases in each successive age group. This is doubtless due to the continued, repeated opportunities for infection.

While with advancing childhood the frequency of infection increases, the morbid process progresses as a rule more slowly. Individual subjects differ much in this respect, but, other things being equal, the older the child, the greater is his resistance. With increasing years the frequency of apparently arrested tuberculosis, *e.g.* in the form of calcified glands and scars, becomes noteworthy. Whether such arrest contributes in any degree to immunity, is a difficult question. Some facts point in this direction. It is possible that some degree of immunisation is established thereby. If so, it is comparatively slight and fleeting. In presence of continuous exposure to, or a massive dose of, infection, the immunity readily gives way, and the progress of disease tends to be rapid.

SCIENTIFIC OUTLOOK.

In this necessarily brief presentation of the subject I have advisedly dealt with the incidence of tuberculosis in the scientific sense. I am concerned not merely with children whose infection is clinically easy of recognition, but likewise with those in whom the infection may be so slight as to have little more than potential significance.

It disturbs me no wise to be told that this conception of tuberculosis is of academic rather than practical value. If we are to understand tuberculosis aright, if we are to form a true judgment on the practical issues of the tuberculosis problem, we require to know the facts with all the exactness of which scientific medicine is capable. We require to keep in view the unity of tuberculosis in its extraordinarily varying manifestations. We must get rid of the artificial distinction between so-called medical and surgical tuberculosis. I would remind my critic that, from the practical no less than from the scientific point of view, the most slender seedling of tuberculosis is potentially as significant as the full-grown tree. It is impossible to say with any certainty which tuberculous seed will be cast off and which will mature.

The usual outlook on this great question calls urgently for readjustment. The existing system of medical examination of

school children for tuberculosis, however serviceable it may be from the administrative point of view, is entirely misleading as regards the incidence of tuberculosis in children. By admission, the returns have reference to obvious cases of disease and have no ultimate scientific value. It is the much slighter degrees of infection which especially merit study. The natural history of the disease is readily followed in the child. The beginnings of the morbid life-history call for minute observation, not only for the child's sake but, in the largest sense, for the sake of the nation and the race.

For here, no less than in other ways, the child is the father of the man. It is the seed lightly sown in childhood that for the most part determines the occurrence and course of tuberculosis in later life.

If the thought be staggering, it is likewise stimulating. For successful implantation of tuberculosis the soil must be in a suitable state and the live seed must be present in sufficient amount for a sufficient length of time. Fortunately the conditions which are most favourable to the healthy vigorous development of the species—indeed the conditions desirable, if life is to be more than existence—are conditions which are unfavourable to the tubercle bacillus.

THE PROBLEM OF PREVENTION.

Why, then, this almost universal distribution of tuberculosis among the youth of the race? The answer brings us to the bed-rock of physiological truth and gives the key to the problem of prevention. Recall present procedure in the rearing of children. In a vain endeavour to protect him from harm the child is clumsily removed from the beneficent ministrations of Nature. The vital atmosphere is replaced by one which is obviously—to the undulled sense—of human provision. Sunlight is obscured by shade of every kind and degree. Nutrition is frequently mismanaged, and natural movement and development impeded by a multiplicity of restraining bands. The process of devitalisation, thus inaugurated, is maintained from week to week and month to month. The infant is prepared for successful invasion by infections of all kinds. Continuously in the unwholesome environment, he falls a prey especially to the tubercle bacillus, by whatsoever channel it may be introduced. For, unhappily, the conditions which are inimical to the life of the child are essentially those favourable to the tubercle bacillus.

The child who has been thus tuberculised is doubly significant

because of what he is and because of what he may become. The tuberculosis of a people begins in the nursery and the schoolroom. It is to the nursery and schoolroom that observation and effort should be directed if measures for the eradication of tuberculosis are to be fundamentally sound and practically effective.

The problem of tuberculosis in childhood will not be solved by the erection of hospitals or homes for cripples and sick children. These have their immediate temporary significance. But beneficent as is their purpose, and splendid as their results have been, they do not carry us far enough. The essential question is not how to tinker up diseased frames. The issues involved are much wider. The problem can only be solved effectively by a better understanding of the physiological needs of developing life and a corresponding renovation of the nurseries and schoolrooms of the nation.

It is folly to dream of transferring all cases of tuberculosis, whether in the child or the adult, to sanatoria and hospitals. To propose this is to plead ignorance of the essential needs of the problem. The purpose is as unnecessary as it is impossible. The great value of the tuberculosis dispensary lies in this, that it goes to the heart of the problem in the household and meets every issue. While caring for the individual in whatever way may be needful, the dispensary regenerates physiologically the dwelling—however humble. It makes the home of the poor man become the nursery of healthy children and cease to be the breeding ground of tubercle-tainted wastrels. Each recreated home is an effective preventorium against tuberculosis.

DYNAMICAL DIAGNOSIS OF THE PULSE.

By THEOPHIL F. CHRISTEN, M.D., D.Sc., of Berne (Switzerland).

WHY is it that many clinicians think * that the old-fashioned palpation of the pulse is of more value than all the sphygmographs or even sphygmomanometers?

There is no doubt that there are two particularly important

* Sir William Broadbent stoutly asserted that the pressure of the pulse could be more satisfactorily ascertained by means of the educated finger than by use of any of our modern instruments (quoted by Gibson, "Lessons from Study of Arterial Pressure," *Edin. Med. Journ.*, January 1908). Did Sir William Broadbent not rather mean the intensity than the pressure? If this be the case, there need no longer be any divergence of opinion between him and the friends of sphygmomanometry.

qualities of the pulse about which palpation gives us some information, whereas no relation can be established between them and the results of sphygmography and sphygmomanometry. These are the *plenitude* and the *intensity* of the pulse beat.

So long as we merely appreciate these two qualities by palpating with the finger, it is not necessary to explain what is meant by "plenitude" and by "intensity" of the pulse beat. As soon, however, as we undertake to *measure* them, we must establish an exact definition. Laying the finger on the artery without any pressure, we are not able to feel the plenitude of the pulse beat. On the other hand, if we apply the finger with a heavy pressure, we may entirely close the artery. Between these two extremes there is an intermediate one, in which we feel a fairly distinct up-and-down movement of the arterial wall. We note that during the diastolic period the artery collapses, due to the pressure exerted by our finger, and during the systolic period it fills up again, due to the mechanical energy (intensity) of the pulse beat. What we call "plenitude" of the pulse is an appreciation of the *blood volume* which is filling the collapsed artery by the action of the pulse beat. In other words, we appreciate *the systolic increase of volume* of an artery, produced by the pulse beat against the obstacle set by our palpating finger. What we call the "intensity" of the pulse beat is the mechanical energy required for filling the artery against the said obstacle.

The greater the systolic increase and the greater the obstacle which is overcome by the pulse beat, the greater will be its intensity. As we shall see later, the intensity is found by multiplying the two former quantities.

Before entering into further detail we must reply to our first question—why the plenitude and the intensity are, for the clinician, the most interesting qualities of the pulse. In the whole of physiology no problem is so essentially dynamical as the circulation of the blood. It is quite impossible to discuss it if only static conceptions are used in the argument. The pressures, as measured by the sphygmomanometer, and their temporary variations, as observed (not measured) by the sphygmograph, are *static* quantities. The filling of a collapsed artery against a given pressure is, however, a dynamical process, and the mechanical energy required therefor is a dynamical quantity. It is for this reason that the palpation of the pulse, by which the plenitude and the intensity are appreciated, gives us more valuable information about the dynamics of the circulation than do sphyg-

mography and even sphygmomanometry, in spite of the apparently more scientific character of the latter.

May it not be possible, however, to transform palpation also into a scientific method? To do so it is necessary to *calculate* instead of to guess, and to *measure* instead of merely to appreciate.

Before measuring anything we must first define it unmistakably. We have already stated that the *plenitude* of the pulse beat is the systolic increase of volume of a given artery, and the *intensity* is the mechanical energy required to bring this about. The only thing that still needs an exact definition is the obstacle that we have to set in the way of the pulse wave in order to produce the diastolic collapse of the artery, just as is done by the palpating finger, for without this there would be no filling and no plenitude, because the physiological variations in the volume of the arteries are very small and almost immeasurable.

One such obstacle has for a long time been in use, viz. the pneumatic armlet. The amount of this obstacle can be exactly measured by the pressure of the contained air. Therefore our further arguments will include the following three quantities:—

1. The pressure exerted by an inflated pneumatic armlet;
unit: $\frac{\text{gr.}}{\text{cm.}^2}$.

2. The systolic increase of volume of the artery (or arteries) covered by the armlet against the obstacle offered by the said pressure, *i.e.* the plenitude of the pulse beat; unit: cm.^3

3. The mechanical energy required hereto, *i.e.* the intensity of the pulse beat; unit: gr. cm.

Before describing the method by which the plenitude and the intensity can be measured in absolute units, we must deduce a simple mechanical theorem, which guides our further arguments.

In Fig. 1 a closed vessel containing gas is represented by G. Whether its walls are elastic or non-elastic is quite immaterial. This vessel is in communication with a small syringe, S, the cross-section of the piston of which has the area q . The pressure within the vessel G is P. The force exerted by the gas on the piston, is therefore equal to the product $P \cdot q$.

Now suppose that we push the piston in a small distance, s . Then an incompressible volume

$$v = q \cdot s \quad (1)$$

has been brought into the closed vessel G. This must increase the pressure within G, and if its walls are elastic they will be

somewhat distended. In every case (elastic or non-elastic walls) the pressure increases. It increases so much the more the less the elasticity of the walls of G. But we have supposed that the distance s is small. Therefore the volume $v = q \cdot s$ is small compared with the volume of the gas contained in G. Therefore the pressure, P , will not undergo any considerable change. Taking into consideration its variation, we may call P_1 its minimum and P_2 its maximum. Then we have to replace the variable quantity P by its mean value

$$P = \frac{P_1 + P_2}{2}. \quad (2)$$

It is of utmost importance to state that the volume v is an *incompressible* one. It is that part of the piston which by our pushing is thrust forward into the closed vessel G. The mechanical

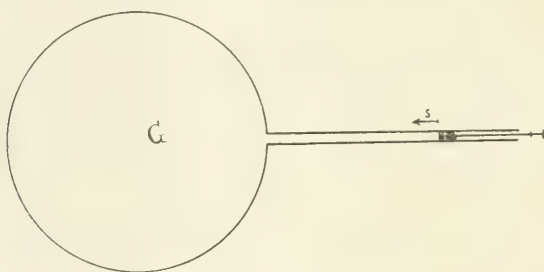


FIG. 1.

energy required for this movement is equal to the product of the force, P , q , and the distance, s . Thus this energy will be found according to the following formula:—

$$E = P \cdot q \cdot s. \quad (3)$$

Replacing the product $q \cdot s$ by its value taken from formula (1) we get

$$E = P \cdot v. \quad (4)$$

Therefore: "*If any small incompressible volume, v , is brought into a closed, gas-containing vessel, whose walls may be elastic or non-elastic, and whose pressure is P , the energy required hereto is equal to the product of the pressure and the incompressible volume.*"

If we now consider what takes place during the systolic increase of an artery surrounded by an inflated annulet, we see that the blood, filling the collapsed artery, causes a bulging of the skin into the air space of the annulet. Because all parts of the limb enclosed by the annulet are incompressible bodies,* the

* Solids and liquids are incompressible, gases are compressible.

volume of this bulging must be equal to the systolic increase of the artery. The effect upon the pressure of the air within the armlet is the same as if we injected a liquid of the same volume into the air space of the armlet.

I once more emphasise the importance of reasoning exclusively with incompressible volumes, because this greatly simplifies all our ideas and arguments. The gas volume of the inflated armlet, which is influenced by temperature and barometric pressure, does not enter at all into our considerations.

The only thing which remains to be settled is the measure of the systolic increase of volume, *i.e.* the plenitude of the pulse beat. When this is known, we only have to multiply it by the mean pressure, P , of the armlet in order to compute the intensity (see formula (4)).

We have already seen that any incompressible volume brought into a closed air space increases its pressure. The greater this volume the greater will be the increase of pressure. If two incompressible bodies of different form, but of equal volume, are brought into the same air space, they must produce within it the same increase of pressure. Therefore if two incompressible bodies of different form, brought into the same air space, produce within it the same increase of pressure, their volume must be equal.

Making use of this fact, we may measure any blood volume which produces an increase of pressure within a pneumatic armlet by another volume which produces the same increase of pressure within the same armlet. We only have to use a graduated syringe, communicating with the air space of the armlet, pushing its piston in sufficiently to produce the same amount of increase of pressure as is produced by the pulse.

Such an apparatus is shown in Fig. 2. It is called the *energometer*, because it measures the energy of the pulse beat. Its armlet being put in place and inflated up to a given pressure, we observe its manometer, which shows regular variations of pressure.

Here it is of great importance to have a manometer of minimal inertia and friction, because it must register exactly the very rapid variations of pressure going on within the air space of the inflated armlet. A mercury gauge, for instance, would be absolutely useless for this purpose, for its inertia is very great and would completely falsify the results.* It is easy to demonstrate that the same amount of variation of pressure produces very different

* Christen on "The New Methods of Dynamical Diagnosis of the Pulse," *Zeitschr. für klin. Med.*, vol. lxxiii. Nos. 1 and 2.

movements of a mercury gauge, according to the quickness of the oscillation. Therefore we may use either a very delicate metallic manometer or an air manometer. The latter being less easy to handle, most workers prefer the metallic instrument. It has, however, been very difficult to obtain such an instrument as would completely satisfy the condition of low inertia and friction combined with the utmost sensibility. I have at last

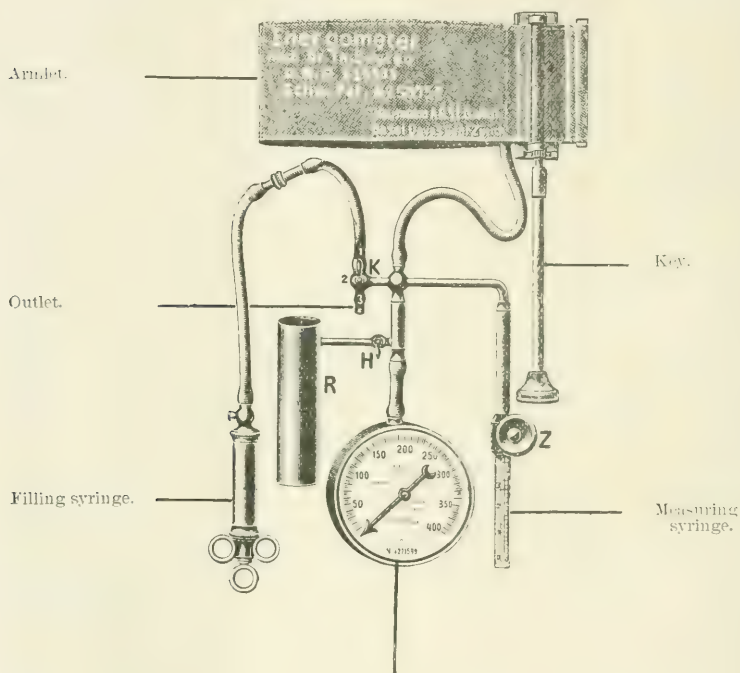


FIG. 2.—MANOMETER.

found one, and now the manufacturer is able to construct energometers which give very good results.

There has been much discussion as to the most suitable pressure for measuring of the plenitude and the intensity, but I think that I have unmistakably settled the question in my above-mentioned paper.

Both quantities, the plenitude and the intensity, are found to be low at small pressures as well as at high pressures. The maxima of their respective values are associated with certain pressures, which vary very much from one individual to another. In many instances the maximum of intensity is found by consider-

ably higher pressures than the maximum of plenitude—this is particularly the case in arteriosclerosis. But usually it will be sufficient to take that pressure where the oscillations of the gauge are the greatest.

Take, for instance, an individual whose pulse produces an oscillation of pressure between 149 and 155 $\frac{\text{gr.}}{\text{cm.}^2}$. After noting this we turn the screw Z (see Fig. 2), which actuates the piston of the syringe. We at once see that the pressure within the annulet increases, the manometer oscillating from 150 to 156, then from 151 to 157, and so forth. We continue up to the point at which the oscillation takes place between 155 and a higher pressure, which is of no more interest to us. The only thing to be observed is to find out the point where the upper limit of the oscillation (155) has become its lower limit. We then know that the pushing in of the piston has produced the same increase of pressure within the closed gas room of the annulet as did formerly the pulse. Therefore the volume of the piston thrust forward must be equal to the blood volume which produced the same increase of pressure. We read this volume off the scale of the syringe and know that it is the plenitude of the pulse.

This volume must not be confounded with the "pulse volume," *i.e.* the volume of blood which passes the artery under physiological conditions. There is no exact relation between these two volumes, but we are inclined to believe that pulses with good plenitudes are also driving on a good quantity of blood.

Having measured the plenitude, it is an easy thing to compute the intensity. The volume v , *i.e.* the plenitude, has been read off the scale of the syringe, and the mean pressure is to be computed from formula (2). In our example we had $P=149$ and $P=155$, so that $P=152 \frac{\text{gr.}}{\text{cm.}^2}$. Suppose that we found a plenitude of 1.5 cm.^3 , then, according to formula (4), we have to multiply the plenitude, v , by the mean pressure, P , and so get

$$E = 228 \text{ gr. cm.}$$

Usually the intensities in healthy people are found between 200 and 350 gr. cm., according to their body-weight, whereas in cachectic conditions they remain below 100 gr. cm., and in instances of violent pulsations they exceed 600 gr. cm. It should be stated that these results are derived from the calf with an annulet measuring 9 cm. in breadth (measured in the direction of the

axis of the limb). There is no doubt that the measurement could as well be taken on the upper arm. Personally, I prefer the calf for more than one reason—Firstly, the amplitudes of the oscillations are somewhat greater than on the arm. Secondly, the patient, being in a recumbent position, relaxes his muscles better, which is of great importance. Finally, when measuring on the upper arm, the patient usually has very uneasy feelings, and even pains in the hand. It is difficult to see why these pains do not arise in the foot when the calf is compressed, but it is a matter of fact that I never heard such patients complain of pain. It is obvious that a patient will remain so much more quiet the less he feels pain or any disagreeable sensations.

It seems to me of much importance to state that the results obtained by the described method are absolutely uninfluenced in any way either by the volume of the air space or by the elasticity of the armlet or of the soft parts. The mechanical energy of the pulse beat, E , is transformed into two parts, viz. the compression of air within the armlet, C , and the elastic deformations of the armlet and the soft parts, S . According to the law of Robert Mayer there must be

$$E = C + S. \quad (5)$$

Here we see that we may not measure the energy of air compression, C , instead of the energy of the pulse beat, E ; for we would find the quantity C so much smaller, the greater are the elastic deformations. Let me cite an example. Münzer of Prague formerly used a method which was founded on measuring the gas compression, C . With this method he happened to state that a cachectic individual, after gaining weight and strength, did not show any increase of "energy" of the pulse beat. Formula (5) easily explains this fact, if we only write it in the following form:—

$$C = E - S \quad (6)$$

When the individual was in a cachectic condition the intensity of his pulse beat was low. At the same time his soft parts were thin, and absorbed only a small quantity of elastic energy, S . After recovery the energy of the pulse beat, E , had increased, but the soft parts also had become thicker, and their elastic deformations under the armlet absorbed a greater amount of elastic energy, S . So it happened that the simultaneous increase of the two quantities E and S did not change the difference $E - S$ and kept C constant.

But the results of energometry are not only independent of the thickness of the soft parts and the elasticity of the annulet, they are equally independent of the gas volume within the annulet. We already stated that this volume does not enter into our formulas nor our arguments. Moreover, the fact that energometry does not depend on this volume can be easily corroborated by experiment. The apparatus may be made to communicate with a reserve volume (R) of 100 cm.³ by opening the stopcock H (Fig. 2). Doing so, we note that the amplitude of the oscillation becomes smaller. But after pushing the piston in the above described manner we see that the volume, read off the scale of the syringe, has remained unchanged.

There is only one element whose influence on the result is not so easy to recognise, viz. the elasticity of the arterial wall. It is impossible to deal briefly with this matter; and I must refer to my above-mentioned paper "On the New Methods, etc. . . ." where some formulæ concerning the mechanics of the arterial walls are published. Further investigations in this direction are going on but I already can say that the particularly high values of intensity in arteriosclerosis are partly due to elastic energy and not to the intrinsic energy of the pulse beat.

Dynamical Diagrams of the Pulse.—Energometry does more than measure the plenitude and the intensity of the pulse beat. Repeating the experiment at *different* pressures we get a series of pressures and corresponding blood volumes. Plotting out the pressures as abscissæ and the corresponding volumes as ordinates we get a series of points, which we may join by a curve. These curves show different forms which are characteristic for different pathologic conditions. Tables I., II., and III. are derived from a patient suffering from myocarditis in a cachectic condition, from a case of arteriosclerosis, and from a healthy individual respectively. The curves corresponding to the pressures and volumes given in these tables are shown in Fig. 3. In considering the height of these curves it must be remembered that the plenitude of the pulse is greater in big people than in small ones. The curve of arteriosclerosis in Fig. 3 is derived from a very small woman. But the *form* of the curve is characteristic, inasmuch that in many cases of arteriosclerosis the decline at the right side of the summit is very slow, whereas in the healthy individual it is fairly steep. In Fig. 4 the intensities are plotted out as ordinates instead of the plenitudes. Here we find the above-mentioned fact corroborated, that in cases of arteriosclerosis

the highest value of intensity is found by a considerably higher pressure than the maximum of plentitude.

Functional Diagnosis.—The study of the circulation under

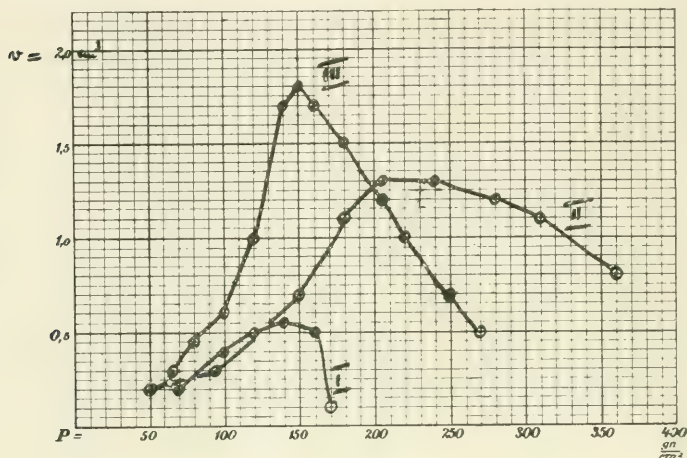


FIG. 3.

different conditions, as after any therapeutic procedure whatsoever, medicines, cures, or after a given amount of work, is recorded

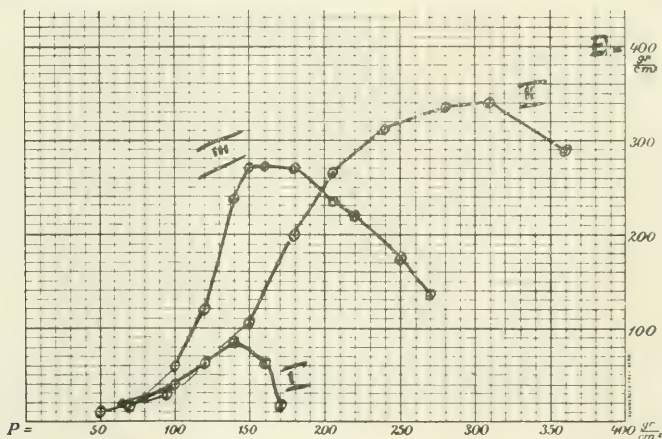


FIG. 4.

in the most exact way by the dynamical diagram. Here we are able to show now a rise or fall of the summit, now a displacing towards a higher or a lower pressure, now a sharper or a flatter form, etc.

It is important that all these variations are measured in absolute units, the volumes in cm.^3 , the pressures in $\frac{\text{gr.}}{\text{cm.}^2}$, the intensities in gr. cm.

Thus energometry opens an entirely new field of clinical investigation, based upon absolutely exact mathematical conceptions.

TABLE I.—MYOCARDITIS IN CACHECTIC CONDITION.

P	V	E
70	0.2	14
100	0.4	40
120	0.5	63
140	0.6	84
160	0.4	64
170	0.1	17

TABLE II.—ARTERIOSCLEROSIS IN A SMALL WOMAN.

P	V	E
50	0.2	10
95	0.3	28
150	0.7	105
180	1.1	198
205	1.3 (Maximum)	266
240	1.3	312
280	1.2	336
310	1.1	341 (Maximum)
360	0.8	288

TABLE III.—HEALTHY INDIVIDUAL.

P	V	E
65	0.3	19
80	0.45	36
100	0.6	60
120	1.0	120
140	1.7	238
150	1.8	270
160	1.7	272
180	1.5	270
205	1.2	246
220	1.0	220
250	0.7	175
270	0.5	135

POLYORROMENITIS OR MULTIPLE SEROSITIS.

By EDWIN MATTHEW, M.A., M.D., F.R.C.P.,
Assistant-Physician, Royal Infirmary.

THIS condition—an inflammation of many serous membranes—is an uncommon one. It occurs in acute, subacute, and chronic forms. We have an acute serositis, for example, when a pleurisy and pericarditis follow a pneumonia. It is with the chronic form I wish to deal, various types of which have been recognised.

The signs and symptoms in a typical chronic case are definite. Briefly they are—a chronic oblitative pericarditis without valvular disease of the heart, enlargement of the liver with perihepatitis, a constantly recurring ascites of large amount, with little or no oedema of the legs or ankles, no jaundice, and in addition signs of involvement of the pleura, peritoneum, and spleen. The condition usually begins in one membrane, and more commonly in the pericardium than any other. The progress of the disease is slow, and the spread from one serous membrane to another is also slow and without definite signs. The cases are only met with clinically when the ascites has developed and become a burden, many years after the original inflammation. The condition is one affecting the serous membranes alone. The abdominal and thoracic organs never become involved. Many names have been given to the condition—polyorromenitis, multiple serositis, polyserositis, Pick's pericardial pseudo-cirrhosis of the liver, Curschmann's "*Zuckergussleber*," Concato's disease.

In many of the fully-developed cases it is difficult and often impossible to trace the onset of this insidious disease, which dates back for a number of years. In the following case we have a continuous record of a clinical history extending over twelve years, and so are able to recognise the primary symptoms and the course of the subsequent events:—

CASE I.—A. W., aged 21. Up to nine years of age she had been a healthy girl and had never been ill. She had not had rheumatism in any form. In June 1900 (at the age of 9) she was admitted to Leith Hospital complaining of pain in the left shoulder and headache. For 14 days previously she had been feeling tired and unfit to go to school but was not confined to bed. On admission the temperature was 102° and the pulse 124 per minute.

Circulatory System.—No subjective phenomena. Marked bulging of the precordial region. Apex beat in usual position and feeble in

character. Right border of the heart 2 inches beyond right sternal margin, left border $\frac{1}{2}$ an inch outside left nipple line. On auscultation the heart sounds were muffled, but there were no endocardial murmurs. In the third and fourth interspaces close to sternum pericardial friction heard.

Respiratory System.—Some dulness at left base, and a few moist sounds at both bases. Pleuritic friction at level of 5th, 6th, and 7th spaces in left axilla.

Other Systems healthy.

Progress.—The area of cardiac dulness gradually diminished and in a fortnight was normal. The pericardial friction was present for a month. At the end of this time the temperature, which had been gradually falling, became normal, and patient subsequently made a rapid convalescence.

The primary condition therefore in this patient was a pericarditis with effusion.

She left hospital and returned to school. Three months later she was again admitted to Leith Hospital, and treated for a left-sided pleurisy with effusion. For this she was in hospital 3 weeks. She went back to school, where she remained till she was 14. Subsequently she served in a furniture shop. At 16 years of age she had pneumonia, and again was treated in hospital, and made a good recovery. For the last three years she has worked as a golf ball maker. After her attack of pleurisy she had fairly good health, and was but seldom absent from school or from her work. At times, however, she was troubled with attacks of breathlessness and blueness of the face and slight swelling of the ankles, perceptible only at night. It had always disappeared in the morning. Occasionally she had to stay at home from school and from her work for these attacks, but did not seek or require medical attention. Since January of this year she has had no attacks of breathlessness or swelling of the ankles, but had noticed that her clothes were becoming tight and that her abdomen had swollen. She continued at her work till the middle of March, when she came to the hospital to see if anything could be done for the abdominal swelling, which had increased enormously.

Condition on Admission.—A well-developed girl. Slight cyanosis of the face. No jaundice; no oedema of feet or legs. No subjective symptoms. Temperature normal, pulse 86, respirations 24.

Circulatory System.—No subjective phenomena. Apex beat in usual position. In the third, fourth, and fifth interspaces marked systolic retraction of chest wall is seen, with diastolic rebound. Normal respiratory movements at epigastric angle not visible, the diaphragm not moving with respiration. Some dilatation of the veins of the neck and slight pulsation. Upper border of cardiac dulness at second rib. Very slight increase of area of cardiac dulness to right and left. On

auscultation the sounds are closed at all the areas and are somewhat faint. Pulse regular in time and force. Systolic blood-pressure 102 mm. Hg.

Respiratory System.—Marked dulness over both lungs behind from sixth rib to base ; rather more marked on left side. No vocal fremitus or resonance and breath sounds only very feebly heard.

Alimentary System.—Abdomen markedly distended and very tense : measures 38 inches in circumference at umbilicus. Dull on percussion all over, and there is a marked fluid thrill. Upper border of the liver at the fourth interspace. Owing to the presence of the fluid the lower border of the liver could not be mapped out. After withdrawing some of the fluid the lower border could be felt 2 inches below the costal margin. The surface of the liver smooth, not hard, with a rounded thickened edge not painful on pressure. It does not descend during inspiration. After evacuation of the fluid the whole abdomen had a doughy feeling. Spleen not enlarged.

Hæmopoietic System.—R. b. c. 5,000,000 ; Hb. 75 per cent. ; w. b. c. 5000. Differential count showed normal proportions of the white cells.

Ascites.—The fluid in the abdominal cavity in these cases of multiple serositis is always excessive, and demands repeated tapplings. Between the first of April and the middle of August patient was tapped seven times at varying intervals. On these occasions 176 ounces, 190 ounces, 214 ounces, 286 ounces, 290 ounces, 284 and 220 ounces were drawn off. The fluid is a transudation, with sp. gr. of 1012, and a small quantity of albumin, and contained only a few cellular elements.

To summarise the twelve years' history of this patient :—We have to begin with an acute pericarditis with effusion, with some pleurisy at the same time. This is followed in three months by a left-sided pleurisy with effusion. Subsequently there is what looks like a long quiescent period, with at intervals slight attacks of breathlessness and some œdema of the ankles. During this time, as indicated by the physical signs now present, there is the slow spread of the inflammation to other serous membranes—without definite symptoms—and involvement of the diaphragm, of the liver, producing perihepatitis, and of the peritoneum. There is no clinical evidence of a perisplenitis, but in all probability such is present. Eleven years after the pericarditis ascites appears, apparently suddenly, but more probably the fluid accumulated very gradually. Coincidentally the attacks of breathlessness and œdema of the ankles disappear. There is an improvement, too, in the general health of the patient, who, but for the mechanical discomfort of the accumulating fluid, is quite well. Physical examination of the chest and abdomen reveal an adherent and obliterated

pericardium, markedly thickened pleurae over the bases of both lungs, an enlarged liver with perihepatitis, with probably adhesions between the diaphragm and the lungs and between the diaphragm and the upper surface of the liver, and some chronic peritonitis.

CASE II.—This is not a typical multiple serositis in the sense of Case I. It had a different origin and course, and followed on mitral valvular disease, and is introduced here as having a distinct bearing on certain points to be discussed in multiple serositis

I will give only the main features of the case.

Mrs. L., aged 45. She had had rheumatic fever six times—when 18, 19, 21, 23, 25, and 36 years of age. She had been under my charge for about eleven years at Leith Hospital as an out-patient, and had also been in the wards on eleven occasions for varying periods. Since her first attack of rheumatic fever she had always been troubled with her heart. She had well-marked mitral stenosis, and was constantly under treatment at the hospital for the usual signs of failure of compensation, viz. breathlessness and swelling of the feet and legs. After rest and treatment she usually recovered sufficiently to be able to resume her housework for a period of months. From about the beginning of 1910 she became less troubled with breathlessness and oedema, and was not in the hospital for over nine months—a longer period than usual. About the middle of 1910 she had observed, however, some swelling of the abdomen never before present. This gradually increased, and in October 1910 she was again admitted to get relief from the ascites. The abdomen was markedly distended, measuring 38 inches at the level of the umbilicus. For some months previously she had also suffered severe pain in the right hypochondrium, slight at first, but latterly more severe and continuous. After the fluid had been drawn off the liver was found enlarged—it had not been so previously—with great tenderness over its surface. A perihepatitis had developed. On this occasion she did not complain of breathlessness, and there was only very slight oedema of the ankles. Subsequent to October 1910 the abdomen was tapped on six occasions at intervals of from two to three months. The amount drawn off averaged about 220 ounces. In April of this year she was in hospital to have the fluid removed, when she suddenly took an attack of heart failure and died.

This patient then, from the time of her first attack of rheumatic fever at 18 up till she was 43, presented the ordinary features of recurrent attacks of loss of compensation in a case of mitral disease. During the last two years of her life these attacks were in abeyance, and the predominant feature in her case was a recurring ascites with an enlarged liver and attacks of perihepatitis. On four occasions also during these last two years

the right pleura was tapped and large quantities of fluid drawn off.

POST-MORTEM REPORT.

Heart.—Marked mitral stenosis: also tricuspid stenosis. Aortic and pulmonary cusps healthy.

Lungs.—Right pleura.—The two layers are very much thickened, particularly over the lower lobe. They are adherent over the lower third. The right lung is adherent to the upper surface of the diaphragm. Left pleura.—Much thickened over lower lobe, and left lung is adherent to the diaphragm.

Abdomen.—Liver is enlarged, firm, and with rounded anterior margin. The capsule of the liver is much thickened all over, and most marked over the anterior surface, where it shows numerous small and large pits or depressions—the typical “iced liver” appearance. The right lobe of the liver is adherent to the under surface of the diaphragm.

Spleen slightly enlarged. The capsule over the upper two-thirds of the spleen is markedly thickened, and adheres to the under surface of the diaphragm.

Peritoneum.—Very slight dulling of the peritoneum.

The post-mortem condition indicated that a multiple serositis had been added to the mitral stenosis. This involved both pleurae, the diaphragm, the peritoneum over the liver and spleen most particularly, and the rest of the peritoneum only slightly, and had begun probably over the liver.

There are several points in cases of multiple serositis which deserve discussion and elucidation.

1. *Diagnosis.*—So far as diagnosis is concerned the chief interest lies in those cases—like Case I.—which occur quite apart from organic valvular disease of the heart. In them the first and prominent phenomenon is a marked ascites, which is found to require frequent tapplings, and which comes on evidently suddenly in an otherwise healthy person. There is not usually a consecutive history to be obtained as in my case; the pericardial condition is latent or missed, and the condition is diagnosed as cirrhosis of the liver. Pick, in 1896, was the first to separate these cases from cirrhosis of the liver. He published three cases having the symptom-complex described. He recognised from the symptoms, signs, and post-mortem findings that there was no cirrhosis of the liver, and that the antecedent pericarditis and the subsequent extension of the inflammation to other serous membranes were concerned in the recurring ascites, and suggested the somewhat clumsy name pericarditic pseudo-cirrhosis of the liver. If, as in

Case I., we have a distinct history of a previous pericarditis, and signs of adherent pericardium when the case is presented, the diagnosis from cirrhosis can easily be made. But even apart from the history, a careful examination of the physical signs will enable a distinction to be made. In multiple serositis one does not find any conditions present likely to produce cirrhosis of the liver. It usually occurs in young persons. There is no jaundice, no sign of congestion in the portal system, and the liver is usually enlarged. The ascites is much greater than in cirrhosis, and frequent tapplings are necessary, and in addition the patient otherwise is quite well. In cirrhosis of the liver, as Hale White has pointed out, the patient, once ascites has set in, does not live long enough to require many tapplings. Patients with multiple serositis live many years.

Some cases were diagnosed as tuberculous peritonitis, but the clinical symptoms and the pathological findings are quite different in the two conditions.

In Case II.—a case of multiple serositis occurring with valvular disease of the heart—the diagnosis was naturally mitral stenosis. For many years the case followed a usual course, but in time the symptoms altered, and a new factor appeared in the recurring ascites, preceded and accompanied by a general perihepatitis. The appearance of the ascites with the marked relief from the antecedent symptoms was due not to mitral stenosis, but, as was recognised during life and corroborated post-mortem, to a multiple serositis. The main interest in Case II. lies in its bearing on the production of the recurring ascites in these cases.

2. *The Origin of the Serositis.*—The inflammation usually begins in one serous membrane and spreads to and affects adjacent serous membranes equally or unequally, and in addition confines itself to serous membranes. The published cases—and Kelly has collected 39 from the literature of the subject—seem to indicate that the original inflammation may start in any serous membrane, but as most of the reported cases either came under observation for the ascites with no clear history, or were diagnosed on the post-mortem table, the origin could only have been presumptive. In five of the cases, however, there was a distinct history of an antecedent pericarditis, in one as long as 23 years before the onset of the ascites. In these five and in my first case the inflammation undoubtedly originated in the pericardium. Taylor thinks the peritoneum is attacked first, and the pericardium least likely to be the first. De Renzi agrees with Taylor, and thinks the spread is then to the right pleura and then to the pericardium: or, the

right pleura is first involved, the peritoneum is next attacked, and last the pericardium. The evidence they offer is not convincing, and in this connection it must be remembered that an adherent pericardium may give rise to no symptoms, and may therefore easily be missed, and possibly in these cases a careful inquiry while the patient is alive will increase the number beginning in the pericardium. The history of the case will help a little in deciding as to the place of onset. When the condition has begun as a perihepatitis or a peritonitis the ascites will occur within a short space of time—maybe weeks, or at most a few months. There will be no oedema of the feet and legs. When the serositis begins in the pericardium the ascites does not appear early. For a long time—usually years—symptoms are entirely absent, or are such as can be accounted for by a tendency to failure of compensation, viz. slight oedema of ankles and some breathlessness. They are probably due to the adherent pericardium interfering with the action of the myocardium and embarrassing it. Then after years the ascites appears and persists. During the interval the serositis had slowly and without symptoms spread to the other serous membranes in the abdomen and thorax.

3. *The Cause of the Ascites.*—This is perhaps the most interesting point in cases of polyserositis, especially in those associated with an adherent pericardium, where ascites is the only symptom for a long time. Many divergent suggestions have been offered to account for it. Fluid in the abdominal cavity is always produced in any degree of direct interference with the return of blood through the portal system, and it has been suggested that the ascites could be so explained in these cases. The thickened capsule of the liver, it was thought, exerted pressure on the structures in the transverse fissure. The portal vein was thus gradually compressed, and ascites appeared, persisted, and increased. It is not likely, however, that a perihepatitis, however severe, could compress the portal vein, for it is difficult to conceive that such pressure acted only on the vein and did not interfere with the bile duct. And in these cases, as I have indicated, there is no jaundice at any time. In some of the cases, also, that came to examination, a direct dissection of the vein and duct in the transverse fissure has shown that there was no compression (Hale White).

Again, it has been suggested that in these cases changes in the liver itself are present sufficient to account for the ascites. We know that in any degree of cirrhosis ascites is present. There is no cirrhosis of the liver in these cases. Pick ascribed the ascites

to the liver in another way. He admitted there was no cirrhosis. There was what he called cyanotic induration. And reasoning from the analogy of cases of heart disease with secondary changes in the liver, he thought that consequent on the pericarditis and adherent pericardium there was an interference with the return circulation which, long continued, gradually produced a congestion or cyanotic induration of the liver, and ascites followed in time. But a study of the post-mortem cases shows that the changes in the liver are never marked (as in Case II.), or are entirely absent. There is never any connective-tissue proliferation, which is the necessary change in the liver for the appearance of fluid in the abdomen.

It is not necessary to look outside the actual conditions present for an explanation of the accumulated and persistent fluid. The serositis can explain the ascites. The difficulty lies in assigning to each membrane its proper share in the result. All the serous membranes on each side of the diaphragm are usually affected, though perhaps not all equally. And we can go thus far. In all the reported cases the general peritoneum and the peritoneum over the liver are always involved, especially the latter. Ascites may occur and does occur in cases where the pericardium is either little involved or not at all. In Case II. there was only a slight recent pericarditis over the right auricle, with a very marked perihepatitis and pleuritis and perisplenitis. When present, the adherent pericardium may help a little, and, indirectly, to account for the ascites. As in Case I., where there were at intervals slight attacks of breathlessness and oedema of the ankles, the adherent pericardium probably interferes with the cardiac action, and the venous return is difficult. This, acting over a long time, produces a chronic congestion of the peritoneum, which aids the chronic peritonitis in producing the ascites. Cases have been recorded, also, with little pleuritis. The most likely explanation of the fluid is to be found in the peritonitis and perihepatitis, which are always present. The peritoneum may not be very markedly involved, as in Case II., but in every case there is sufficient peritonitis to account, at any rate partially, for accumulation of fluid in the abdomen. The inflammation and thickening of the capsule of the liver are always marked, and I am inclined to assign to this the greater share in the production of the ascites. The liver, too, in these cases is usually adherent to the diaphragm, as also are the lungs. The movements of the diaphragm are reduced to a minimum, and, in addition, the channels of communication

through it are blocked. In polyorromenitis the liver, at first enlarged, gradually becomes smaller through compression by contraction of the thickened fibrous capsule. This gradual squeezing of the liver, ending in its becoming very small, will also assist effusion to collect.

4. *Pathology of Multiple Serositis*.—Various opinions have been expressed as to the cause of this form of chronic inflammation in the serous membranes, and particularly in the group in which the pericardium is first involved. Naturally rheumatism has been suggested as a factor, and certain of the published cases which originated in the pericardium did occur in rheumatic subjects. In cases like Case II., which follow valvular disease of the heart, the serositis is undoubtedly rheumatic. Here we had an antecedent history of six attacks of rheumatic fever and a rheumatic endocarditis. Multiple serositis has been said to follow acute infective conditions, such as typhoid, scarlet fever, and syphilis, but no clear proof has been offered.

Probably a large proportion of the cases are tuberculous. Some of the published cases are set down as tuberculous, even though there was a difficulty in demonstrating the tubercle bacillus or typical tuberculous lesions post-mortem. In one or two of the cases recorded by Kelly the pericardium, where the serositis had originated, had presumably become affected from a tuberculous bronchial gland. In the tuberculin test we now have a means during life of obtaining considerable help. Case I. gave a markedly positive reaction to the subcutaneous test, and the serositis is undoubtedly tuberculous. No clinical evidence of tuberculosis is present in the lungs or elsewhere. Picchini, quoted by Taylor, states that all the subacute and chronic cases of polyorromenitis are tuberculous. He points out that the condition does not necessarily attack and affect those with the tuberculous diathesis; that the membranes are attacked in a much more insidious and less acute way than in ordinary tuberculous inflammations; and that in multiple serositis the tuberculous condition is confined to the serous membranes, and does not invade the subjacent organs, and never invades the lung.

Note on Treatment.—Tapping the abdomen and withdrawing the fluid is our only resource in recurring ascites. In these cases where the fluid accumulates very rapidly this constitutes a considerable drain on the patient's blood and strength. In order to delay the accumulation, if possible, I have been using

in multiple serositis and other conditions that are accompanied by ascites intra-peritoneal injections of adrenalin solution (1 in 1000). The fluid is first withdrawn. Fifteen to twenty minims are then injected daily. In two cases, probably cirrhosis of the liver, adrenalin had no beneficial effect. In Case I. and Case II., and in one other of doubtful diagnosis, the injections undoubtedly delayed the accumulation as long as from 4 to 6 weeks. To Case I., where the quantity lost is large, and where the reaccumulation is very rapid, this must be of considerable benefit.

In this case, at the beginning of a series of injections, when the abdomen had but little fluid in it, the injections produced rather unpleasant effects. Within about two minutes the patient became pale and somewhat cyanosed, and complained of feeling faint and sick. The pulse rose to 112 per minute from 84. These effects passed off in about ten minutes. This happened at the beginning of each series. I have observed the same symptoms follow adrenalin given subcutaneously in asthma. I think adrenalin injections worth a further trial in cases of ascites.

REFERENCES.—Kelly, *Amer. Journ. Med. Sci.*, 1903; Osler, *Practice of Medicine*; Pick, *Zeitschr. f. klin. Med.*, 1896; Taylor, *Brit. Med. Journ.*, ii. 1900; Hale White, *Allbutt's System of Medicine*.

THE TREATMENT OF SIMPLE FRACTURES BY MASSAGE AND MOVEMENT, ILLUSTRATED BY CASES TREATED IN THE SURGICAL OUT-PATIENT DEPARTMENT, ROYAL INFIRMARY, EDINBURGH.*

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THE appointment by the British Medical Association¹ of an influential committee "to inquire into and report on the ultimate results obtained in the treatment of simple fractures, with or without operation," marks an awakening interest in this branch of surgery.

From time immemorial fractured limbs have been treated by

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rigid *external* splints and by complete rest for a varying number of weeks until the bones have firmly united. Many splendid results have thus been obtained, but the proportion of *functional* failures has been too high and complications have occurred too frequently.

Within recent years an operative school has arisen, advising open operation in simple fractures. Accurate anatomical alignment is secured, and maintained by *internal* splints of metal plates, screws, wire, or staples. But the once simple is converted into a compound fracture, a foreign body is introduced into bruised tissues, nerves run a new risk from the surgeon's instruments, muscles are divided and bruised, periosteum and bone must needs be perforated in several places by screw nails or staples. The further treatment is immobilisation until the wound has healed.

The operative treatment of simple fractures can never become generally applicable. Its sphere is restricted to surgeons of special experience and assured asepticity. The operator must have suitable instruments and adequate skilled assistance. This method relegates the treatment of simple fractures to the specialist, and, if generally adopted, would lead to still further congestion and expense in our hospitals.

In both these methods—the traditional and the operative—the broken bone alone is considered. Both are concerned only with restoring an artificial rigidity to the bone after securing accurate alignment of the fragments. Each by itself is inadequate, because neither considers the injuries to the soft tissues which accompany all fractures and account for many of the after-complications. The necessary supplement is to be found in the method by massage and movement, introduced over thirty years ago by Lucas Championnière of Paris. During these years he has practised and perfected this method with enviable results. For a complete and convincing account of his method reference must be made to his most recent publication.²

In this country Professor John Chiene, Sir William Bennett,³ James B. Mennell,⁴ and others have advocated Championnière's methods.

My experience of the method is based upon over four hundred cases of recent fractures treated from the first by massage and movement in the Surgical Out-Patient Department, Royal Infirmary, Edinburgh, during the period of my clinical assistantship—January 1910 to March 1911. These patients were all

examined with the X-rays at the commencement of treatment, and progress notes were kept. After a sufficient interval of time *all* these patients were asked to report for re-examination. About one hundred and fifty responded. New radiograms were taken to show the condition of the united bones, also a considerable number of photographs recording the appearance and range of movement in the injured limbs. Facts were elicited regarding the period of time off work, compensation, and present capacity for work. The results were extremely gratifying. The patients themselves have praised a treatment that was comfortable during its progress, and that rapidly restored them to almost their former condition.

That this method is practicable outside a large hospital has been proved by excellent results obtained in cases treated at home under the supervision of general practitioners.

Naturally the present investigations were limited to fractures suitable for out-patient treatment, viz. simple fractures of the shoulder girdle and upper extremity, and uncomplicated fractures of one bone of the leg, ankle, and foot. But the principles underlying this method of treatment are more general in their applicability.

General Pathology of Simple Fractures, and Deductions therefrom.—The question of treatment in medicine and surgery turns largely upon the pathology of the condition present. It is so with fractures. Formerly the whole attention was concentrated on the break in the bone, but this is inadequate. A limb so injured as to have sustained even a simple fracture of a bone is severely and extensively damaged as regards the soft tissues. Muscles are bruised and in part torn; nerves are bruised; blood-vessels and lymphatics are torn and thrombosed, blood and lymph are extravasated; effusion occurs into tendon sheaths and into the neighbouring joints, and if the fracture involves a joint, the effusion will be largely composed of blood.

The blood extravasated between the ends of the bone is of use, as it forms the scaffolding for granulation tissue, which in time becomes osseous in character (callus). But the blood extravasated into the soft tissues serves no known useful purpose. It is foreign material, and in time is removed as such by the ordinary drainage media—the lymphatics and blood-vessels. If these effusions and extravasations are not rapidly removed, organisation will take place, with the formation of adhesions between articular surfaces, between tendons and their sheaths, and between nerves and the surrounding tissues, producing “matting” of the soft parts. The

consequence is prolonged stiffness in joints, impaired function of muscles, and the persistent œdema and secondary pains so commonly present after fractures. Organisation occurs during the first nine or ten days, hence during this crucial period it is of paramount importance that the local drainage apparatus—the circulatory and lymphatic systems—already reduced in efficiency by the injuries received, should be aided in their work of débris removal. All repair and regeneration, whether of bone or of soft tissues, are dependent on the satisfactory working of the local circulatory and lymphatic systems. If these two systems are placed under good working conditions, then repair will go on apace, granted ordinary normal tissues. It appears to me that these facts have not been sufficiently appreciated. Neither the traditional treatment by external splints nor the modern operative treatment by internal splints professes to aid these processes of débris removal and of repair.

Massage rapidly removes these effusions and extravasations by restoring the local lymphatic and circulatory drainage to its former efficiency, thereby increasing the vitality of the tissues and hastening repair. Movements, if properly ordered, will prevent adhesions forming, and by a kind of internal massage will also aid the local drainage apparatus. Massage and movement, as yet recognised only as valuable adjuncts some days or weeks after the injury, should be considered as a *fundamental* part of the treatment of a simple fracture, to be commenced at once.

The Various Actions of Massage as Applied to Fractures.—

1. The first effect observable is one termed "*anæsthetic*" by Championnière. The explanation of this clinical phenomenon is probably the relief of tension on the peripheral nerve-endings from the removal of exudates. This soothing effect is immediate, lessens the patient's nervousness and excitability, and increases his confidence in the surgeon's future procedures. Hence in any injury that may include a fracture the *first* procedure should be the application of this anæsthetising massage, even while the history of the accident is being obtained and before the diagnosis is completed. This will render the diagnosis easier, because the patient will allow freer manipulation of the injured limb.

2. The next observable action of massage is the *reduction of swelling*. The massage aids the onward flow in the lymphatics and superficial veins; thus a negative pressure is produced in these vessels, and exudates are quickly absorbed and removed. It may be that massage stimulates the endothelial lining of these vessels

and excites increased action. All swelling rapidly subsides, and the marks of bruising gradually disappear, so that in the course of a few days the limb has a perfectly normal appearance, with complete absence of that brawniness so commonly present after severe injuries. There is a marked correspondence between the severity of the bruising and the length of time that elapses before union is obtained, *i.e.* the tissues must remove these altered blood elements before the work of repair and regeneration can make much headway.

3. The next apparent action of massage is the *restoration of freedom of action* in the joints and tendons, and the *return of tone and function* to the muscles. Freedom of action follows naturally from the removal of extravasations and effusions before organisation can take place. The return of muscle tone and function is due to the mechanical excitation and nerve stimulation by the massage, combined with the increased vitality from good blood-supply and drainage. Muscle soon degenerates from inactivity. Add injury and poor blood-supply to this inactivity and the degeneration is rapid. Voluntary contraction cannot be obtained and is to be avoided at first, but massage and passive movements can take its place very efficiently.

4. A further and most important action of massage is the *allaying of muscle spasms*. These involuntary muscular contractions are very painful, and prevent the patient getting any adequate rest day or night. They also do much to make initial displacements persist, may render manipulations for reduction unsuccessful, and may even produce displacements *de novo*. To allay these spasms means comfort to the patient, and may lead to spontaneous reduction of displacement, with a total disappearance of all tendency to redisplacement. A few days' massage will often transform an irreducible fracture into one easily reducible and easily controlled. It is this fact that renders possible the reduction to a minimum of all restraining apparatus. This is perhaps best seen in fractures of the shaft of the humerus, where the deltoid stands out in frequent spasm and causes angling at the site of fracture. After three or four days' massage this spasm disappears, and with it all necessity for rigid restraining apparatus. If not so evident clinically in fractures of bones more deeply situated, it is none the less real.

Massage does not remove the necessity for reduction. It may render advisable the postponement of reduction for a few days, when the fracture will have become more easily controlled. It certainly makes reduction easier.

5. The next phenomenon accelerated in its appearance by massage is the *formation of callus*. This method is practically a guarantee against delayed union and non-union. There was no case of delayed union or of non-union among the four hundred patients treated by this method during the period of investigation. Since then, however, I have had one case of delayed union of the ulna in fracture of both bones of the forearm in a man *æt.* 30, who was treated by this method from the beginning.

The certainty and rapidity with which callus forms is due to the state of vitality into which the limb is brought by the massage aiding the local circulation. Doubtless the slight movements that are scarcely avoidable between the fragments when massage is practised excites callus formation.

There is a personal factor in each case. In some patients callus is developed more rapidly and more abundantly than in others. Massage must therefore be regulated as firming occurs, the sittings being shortened and the periods between the sittings lengthened. Too much massage or too heavy massage will create a callus tumour. Through time much of this excess of callus is reabsorbed provided function is maintained, but excess of callus near a joint may considerably impair movement.

There is a very exact ratio between the age of the patient and the amount of massage that is necessary. The younger the patient the less massage is required. Young tissues are extremely susceptible to massage and react quickly to it. On the other hand, the bones of the aged react sufficiently well to massage. Many of my cases refer to people over sixty, and to several over seventy. In my experience aged bones and adult bones unite equally well. There is a great difference in the recuperative powers of the joints, so that as age increases, massage and movement as the basis of treatment for fractures and joint injuries become more imperative.

Technique and Character of the Massage.—The kind of massage applicable to fractures is of a special character. It has to produce all the above beneficent results, and has to avoid doing any harm; it has to take away pain, never to add any, and should be soothing and agreeable to the patient from the outset. It is not complicated in nature, but consists in smooth, gentle, upward rubbing, rhythmic in character, always in the same longitudinal direction, following the venous drainage and the direction of the muscle fibres. This massage should commence proximal to the site of fracture, *e.g.* at the shoulder in a fracture of the humerus, at the elbow for a fracture

at the wrist. Gradually the site of fracture is approached, but it is better to "leap over," as it were, the actual level of the break. The massage should then be extended to the most distal part of the limb.

The Masseur.—No sleight of hand is necessary. There are two requisites—a soft touch and an intelligence equal to master the fact that there is a broken bone in the limb under treatment. Hence it is that the masseur skilled in ordinary massage requires special knowledge, aptitude, and experience in this branch of his work. Some, naturally, have not the necessary lightness of hand, and to such this work is not suited. When a masseur is employed, he must work under the direct supervision of the doctor. There is no doubt that the best masseur for fractures is the doctor himself. He has the knowledge both of the anatomy of the part and of the pathology of the lesion. His training has tended to develop a habitual softness and delicacy of touch. Thus one of the great objections to this method of treatment is removed at once. A masseur with special aptitude for fractures is not always obtainable, but he is not indispensable.

The Position of the Limb during the Massage.—For the upper extremity a firm pillow on the masseur's knee serves as an excellent support for the forearm and hand. The masseur's disengaged hand may be utilised as an immediate local support at the site of fracture. In fractures of the lower extremity the patient will usually be in bed.

The Lubricant.—In the Surgical Out-Patient Department a powder is used consisting of equal parts of talc and boric acid. Championnière prefers olive oil. Where the patient himself or his friends are to perform massage for lesser lesions such as bruises, olive oil is to be recommended, as it reduces the friction when the palms are rough.

Date of Commencing Massage.—If massage can be anæsthetic, then it will aid diagnosis, and as Championnière relates, was so employed by Rizet, a military surgeon, long before its adoption as a routine method of treatment. If massage can allay muscular spasm, it should precede any attempt at "setting" the fracture, and in some cases will remove all necessity for reduction. In most of the recent text-books dealing with fractures, massage and movement are advised some days after the injury. But the comfort derived by the patient from massage demands its immediate application. Delay is dangerous, because the soft parts become hard and brawny, a condition difficult to remove but easily prevented.

Massage is therefore to be begun *at once*, while the history of the accident is being obtained, and before the procedures necessary for diagnosis and reduction.

Duration of Séance.—The sitting should not exceed fifteen minutes. Too prolonged massage causes over-excitation of the muscles with resulting spasm, the very thing one is endeavouring to allay. When firming occurs massage should be gradually diminished and more attention paid to movements.

Interval between Séances.—Twenty-four hours should elapse between the sittings. Too frequent massage produces the same untoward results as too prolonged massage. The first nine or ten days form the crucial period, during which the sittings should be daily, so as to secure the rapid removal of effusions and extravasations. Towards the end of the treatment the interval between sittings may be lengthened.

Action of Movements—Active and Passive.—The separation of movement from massage, as applied to fractures, is artificial. The two procedures go on *pari passu*, with this reservation, that as massage is gradually lessened, movement is increased.

Passive movements prevent adhesions forming in the joints and in the tendon sheaths and thus after-stiffness is avoided and full function regained. The muscles are kept on the move, alternately stretched and relaxed, and with them the nerves and blood-vessels, so that adhesions cannot form between any of the soft tissues and after-pains are avoided. This *internal massage* also improves the local circulation and thereby improves vitality.

Active movements effect the same results to a greater degree, and in addition prevent any tendency to muscle degeneration. The importance of early movement increases with the proximity of the fracture to a joint, and especially with the age of the patient, seeing that the joints of old people have little recuperative power.

At the Surgical Out-Patient Department almost complete range of movement was obtained in fractures of the surgical neck of the humerus in people aged between sixty and seventy-five from early employment of movement at the shoulder joint (Figs. 2 and 9).

Character of the Movements.—Full amplitude of movement is not necessary to prevent adhesions; very small movements are sufficient. In conjunction with Championnière, I would emphasise the absolute necessity for observing a slow progression, for stopping the movements short of that range which causes pain, of multiplying and repeating the movements rather than increasing

their amplitude. All violence and all rapidity are contra-indicated. The criterion, again, is painlessness.

Technique of Movements.—Before movements are attempted it is necessary to fix the fragments by grasping the limb at the site of fracture with the disengaged hand. This prevents the occurrence of displacements or of any movement between the fragments which would cause pain.

It is well to begin movements at the most distal joints and to advance upwards to the other joints. Sometimes difficulty is experienced with excitable patients by their resisting any attempts at passive movement. This resistance causes voluntary contractions of the muscles, which tend to produce displacements and certainly cause pain.

The same difficulty may proceed from the patient trying to help in the movement. The preceding massage produces such a feeling of local well-being that he feels capable of moving the injured limb. Before passive movements are commenced the patient should be warned to leave the limb absolutely to the masseur, and it is a good expedient to distract attention away from the limb by engaging in conversation.

Active movements of joints controlled by muscles attached to the fractured bone are best delayed till union has occurred, that is for fourteen days or more. During this time passive movements are sufficient, while massage maintains the tone of the muscles. As soon as possible, however, small active movements should be practised.

The Sequence and Varying Proportions of Massage, Passive and Active Movements Throughout the Course of Treatment.—Massage should always precede movement, and passive movement should always precede active movement. This sequence holds good for every séance throughout the course of treatment—first, massage; second, passive movement; third, active movement. At first massage is the most important element, and the séance is concluded with passive movements, and in chosen cases with small active movements.

As soon as union is present massage is diminished, and passive movements occupy the place of importance. Gradually active movements predominate, so that towards the end of the treatment very little massage and passive movement are given.

As soon as it is considered safe the patient should be encouraged to perform simple and useful active movements, such as—in the case of the upper extremity—reaching the mouth, touching the

back of the neck and the small of the back. Soon after he may use the hand while eating, dressing his hair, and putting on his clothes.

The discretion of the operator and the feelings of the patient can be trusted not to begin this too soon and not to delay it too long. The patient is conscious of the return of function, a deep impression is made on his mind, and malingering is avoided.

Displacement and Reduction.—Gross displacement is to be rectified by manipulation, extension, or open operation, and recurrence of gross displacement is to be prevented by splints, external or internal. But no one of these manœuvres renders unnecessary or contra-indicates the immediate use of massage and movement. It is customary to proceed at once to the correction of displacement. This may not prove the best course in all cases, because massage by allaying spasm renders reduction very much easier; by removing swelling, massage allows of more certain palpation of the fragments and of their lie to one another, and so renders reduction more complete. Thus reduction may best be delayed for hours or days, according to the case, until massage has produced conditions favourable to a more certain correction of displacement. In some cases massage removes the necessity for forcible reduction, by gradually and painlessly producing it of itself.

Slight displacement may often be left unreduced without any diminution in the function of the limb. There has been too much effort expended in the past in trying to obtain exact anatomical alignment, with needless increase of suffering to the patient and with no actual permanent gain. Massage often removes slight displacement, and at least prevents the displacement diminishing the future function. Championnière rightly distinguishes “useful” from “absolute” reduction. Radiograms of fractures which have been “reduced” by manipulation show in many instances that the reduction was not absolute and yet function is unimpaired. Very seldom indeed does reduction by manipulation produce absolute reduction, and this is the great plea for open operation.

In cases treated by immobilisation in splints where slight displacement persists and impaired function results, I would suggest that the blame may be due to the immobilisation and not to the want of exact anatomical alignment. Slight displacement is compatible with perfect function, and in many cases with perfect appearance, no observable deformity resulting.

Impaction.—Impaction is three-fourths union, and is to be

preserved unless associated with gross displacement. The value of impaction is recognised in fractures of the neck of the femur in old people; its value should be recognised in fractures of the surgical neck of the humerus and in Colles's fractures.

Other Complications of Simple Fractures.—Fat embolism, painful and weak callus, excessive callus involving a nerve, non-union, atrophy of muscles, Volkmann's ischaemic paralysis, matting of the soft parts, persistent oedema, secondary pains, stiffness of joints, arthritic changes in joints, are complications which might have arisen in a series of over four hundred fractures. That no one of these complications arose may be sheer good fortune, but some credit surely is due to the method of treatment employed.

Simplification of Apparatus.—The treatment of fractures by massage and movement allows of great simplification of splints and restraining apparatus. It does not remove the necessity for these, but reduces their importance by rendering easy the control of a fracture owing to the rapid disappearance of muscular spasms. In this series of cases the very simplest apparatus was employed with satisfactory results and with much greater comfort to the patient. I have treated eleven fractures of the shaft of the humerus without any rigid splints at all. When rigid splints are employed they can be finally removed at an earlier date than is usual.

I do not advocate the discarding of splints, but I do advocate their daily removal, especially during the first week, to allow of massage and movement.

Technique Applied to Individual Fractures.—The following is a brief outline of the methods I employed in dealing with fractures at the Surgical Out-Patient Department, Royal Infirmary, Edinburgh:—

In *fractures of the clavicle* the arm was placed in that position which gave the best alignment and least deformity. A sling with its base to the elbow supported the arm in this position, a layer of wool separated all apposing skin surfaces, and a broad body bandage fixed the arm to the chest wall. Access was easy for the daily massage and movement. The body bandage was removed in ten to twelve days, and the sling at the end of the third week. At the end of the fourth week the patient was usually fit for manual work. There was seldom any apparent deformity, even in those cases in which overriding of the fragments persisted.

In *fractures of the surgical neck and shaft of the humerus* the same apparatus was employed—sling with its base to the wrist,

wool separating apposed skin surfaces, and broad body bandage binding the arm against the chest wall. In surgical neck lesions movements were commenced early, especially in old people, but the last movement attempted was rotation of the humerus. The body bandage was required for fully two weeks and the sling for about four weeks. At the end of the sixth week the patient was usually fit for work. There was seldom impairment of movements at the shoulder and the muscles were always in good condition.

I have never applied more than a sling and body bandage in treating fractures of the shaft of the humerus. More padding with wool is necessary over the outer and back aspects of the arm, and during sleep a pillow should be placed under the injured arm so that the patient cannot roll over on to that side. During the daily massage the fragments are fixed by the masseur's disengaged hand. Spasm of the deltoid is soon allayed by light massage, and finally disappears in three or four days' time, and with it the tendency to displacement from that cause. Firming is felt in ten to fourteen days, but may be delayed if much bruising is present. It must be remembered that, although the bone feels solid and now moves as one united piece, the callus is still soft and pliable. Hence want of care on the patient's or masseur's part may still produce displacement. This callus gives no shadow in a radiogram but is easily felt. At the end of the third week the body bandage may be omitted, and at the end of the fourth or fifth week the sling may be omitted. By the end of the sixth or seventh week the patient is fit for light work. The muscles are always in good condition and the joint movements unimpaired.

Supracondylar fractures of the humerus, fracture of a condyle, separated lower epiphysis of the humerus, fracture of the head of the radius, fracture of the coronoid process of the ulna, that is, all injuries around the elbow joint (except fracture of the olecranon), were treated in acute flexion with a sling supporting the elbow. A body bandage was usually applied for the first few days. Massage was limited from the first, more attention being paid to movements. These at first were confined at the elbow joint to flexion, supination, and pronation. Experience shows that these are the movements most easily lost and most difficult to regain. Extension is postponed till consolidation has occurred, because this is the movement that might readily cause displacement. The sling can be omitted at the end of three weeks. The weight of the arm and active use soon restore the power of complete extension.

The diagnosis of fractures in the region of the elbow is often difficult on account of the rapid effusion and swelling, and sometimes impossible without the help of radiograms. Immediate diagnosis is not essential for successful treatment, which is very much the same for all varieties. Massage employed for a few days will so reduce the swelling and pain that a more exact examination can then be made. A radiogram should be obtained whenever possible, because we are still learning as regards these lesions around the elbow. But it is not necessary to delay treatment till a radiogram has been secured, nor is it advisable to pull the part about to satisfy one's diagnostic curiosity.

Fractures of the olecranon process with wide separation of the fragments have been successfully treated at the Out-Patient Department by massage and movement, with complete restoration of power and function and with *ossseous* union of the fragments (Figs. 7 and 10). The only apparatus was a sling supporting the elbow flexed to a right angle. Movements were practised from the first.

The chief trouble in fractured olecranon is the tendency of the proximal fragment to adhere to the posterior aspect of the humerus. This causes stretching of the union between the fragments when the elbow is flexed, and in time leads to atrophy of the triceps. This adherence of the proximal fragment to the humerus is prevented by massage and movement. In performing flexion and extension of the elbow the masseur should press the proximal fragment of the olecranon downwards with his thumb, so that it follows the ulna in its movements. This is of the greatest importance, both in the passive and active movements. The sling can be omitted after the second week and the patient encouraged to use the arm.

When so treated, fracture of the olecranon with separation loses all claim to be called serious. Championnière always sutures the patella, but never the olecranon, except in bad results from immobilisation.

Fractures of the Forearm.—Fractures of both bones with displacement are most difficult to treat successfully so as to restore full function with the minimum of deformity. In a few of my recorded cases the fracture was "set" under an anæsthetic, in the other cases massage was trusted to overcome muscular spasm and so to lessen the displacement. Radiograms showed in most cases incomplete reduction, yet the return of function and the ultimate appearance were satisfactory. If *absolute* reduction is desired,

open operation is the surest way of obtaining it. Anterior and posterior rigid splints are applied and the arm placed in a sling. Passive movements of the fingers, wrist, and elbow are commenced at once, but supination and pronation are postponed till union has taken place.

In *fractures of the radius or ulna* alone a single posterior splint is often sufficient.

In *greenstick fractures of the forearm* the arm is straightened under general ethyl chloride anæsthesia and a posterior splint applied. Massage is limited, as young bone is very active of itself and excess of callus is easily produced.

Colles's fracture is not a serious injury if treated by massage and movement from the very first. In the cases included in this investigation reduction was performed only when the displacement was gross. Impaction was carefully preserved when reduction was not performed. Practically complete restoration of function was obtained in four weeks' time, even although some deformity persisted. In most cases no splints were applied, merely wool, bandage, and sling. In the reduced cases a simple anterior splint was applied for a few days, but the fingers were left free. Passive movements were commenced at once, and included the lateral movements at the wrist, so important in many manoeuvres such as light hammering, painting, etc. In three weeks the patient was able to use the hand for light work without discomfort, and in four weeks for full work. In the cases of Colles's fracture, which I have re-examined, pain and discomfort over the ulnar styloid, where that was detached, were not infrequent. Radiograms show that the detached ulnar styloid seldom, if ever, becomes reunited to the ulna.

In most cases it is useless to attempt reduction without a general anæsthetic, and in many cases manipulation by the hands will fail, calling for the employment of a wrench.

Fractures of the lower end of the radius involving the radio-carpal joint and the various varieties of "chauffeur's fracture" were treated similarly to Colles's fracture with satisfactory results.

Fracture of the metacarpals, including Bennett's fracture at the base of the first metacarpal, were treated with wool, bandage, and sling. No special splints, no closed-list bandage, and no extension apparatus were employed. The results have been satisfactory and rapidly attained (Figs. 14 and 15).

Fractures of the phalanges have done equally well under similar treatment.

The fractures of the lower extremity treated at the Out-Patient Department included Pott's fractures without displacement and fractures of the tibia.

The fractures of the tibia all occurred in children, and varied in severity from fissured fractures to spiral fractures with rotatory displacement. These were treated from the commencement by massage and movement. A posterior moulded splint of poroplastic felt stretching from the heel to above the knee-joint was applied. Sometimes the child was brought to the Out-Patient Department in a mail-cart, sometimes crutches were provided and the child walked to hospital. The duration of treatment averaged about four weeks.

Pott's fracture without displacement and fractures of the internal malleolus are sometimes difficult to diagnose from a severe sprain without the help of radiograms. The treatment, however, is the same as for a sprain, viz. avoidance of bearing weight on the foot by using crutches, massage and movement, wool and a firm bandage. Gentle massage is more efficacious than the favourite lead and opium fomentation. The cure is rapid and there are no secondary pains or stiffness.

Fracture of a metatarsal was similarly treated.

Statistics are often misleading, especially when small numbers are concerned, but the averages given below from the cases re-examined are at least interesting. In computing the average period off work, only adults are included.

FRACTURE OF CLAVICLE.

Number included in Average.	Average Séances.	Average Period of Treatment.	Average Period off Work.
4 children.	6	2½ weeks.	
4 adults.	20	5 weeks.	5½ weeks (no compensation). 5¾ weeks (compensation).

FRACTURE OF SURGICAL NECK OF HUMERUS.

10 adults.		19		4½ weeks.		4 weeks (no compensation).
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FRACTURES OF SURGICAL NECK OF HUMERUS, OF OLECRANON, AND OF RADIUS AT COLLES'S LEVEL.

1 adult.		46		14 weeks.		10 weeks (no compensation).
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FRACTURES OF SURGICAL NECK OF HUMERUS AND OF OLECRANON.

1 adult.		30		6 weeks.		27 weeks. Unduly prolonged by compensation claim.
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FRACTURE OF SHAFT OF HUMERUS.

Number included in Average.	Average Séances.	Average Period of Treatment.	Average Period off Work.
8 adults.	31	6 weeks.	6½ weeks (no compensation). 3 months (compensation).

FRACTURES IN REGION OF ELBOW

Including Supracondylar Fractures, but excluding Fractures of Olecranon.

16 cases.	16	4 weeks.	5 weeks (no compensation).
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FRACTURES OF OLECRANON WITH SEPARATION.

2 cases.	26	4½ weeks.	One never off (no compensation). One 4 weeks off (compensation).
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FRACTURE OF BOTH BONES OF FOREARM.

15 cases.	17	4½ weeks.	2 weeks (no compensation). 4 months (compensation).
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FRACTURE OF ONE BONE OF FOREARM.

14 cases.	14	3½ weeks.	3 weeks (no compensation). 6 weeks (compensation).
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COLLES'S FRACTURES.

25 cases.	15	3½ weeks.	4½ weeks (no compensation). 3½ weeks (compensation).
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FRACTURES OF METACARPALS.

5 adults.	11	3 weeks.	2½ weeks (no compensation). 4 weeks (compensation).
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FRACTURES OF TIBIA.

2 children.	16	3½ weeks.	
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FRACTURES AT ANKLE.

6 adults.	12	3 weeks.	3 weeks (no compensation). 4½ weeks (compensation).
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JONES'S FRACTURE—AT BASE OF 5TH METATARSAL.

1 adult.	22	5 weeks.	6 weeks (compensation).
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From the averages it is seen that compensation lengthens the period of incapacity. In Colles's fractures those on compensation were actually a shorter period off work. This method of treating fractures does not breed malingerers.



FIG. 1.

Oblique fracture of surgical neck of right humerus in a woman aet. 71; treated by massage and movement—23 séances; sling and body bandage; 6 weeks off work as charwoman; no compensation.



FIG. 2.

She had practically full range of abduction, but the movement shown in the photograph is, in my experience, the most difficult to regain.

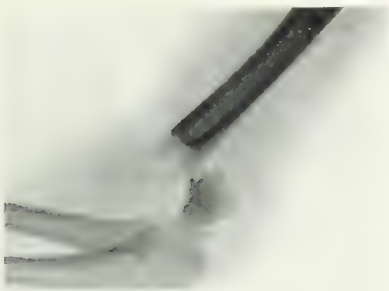


FIG. 3.



FIG. 4.



FIG. 5.



FIG. 6.

Supracondylar fracture of the humerus, with backward displacement of the lower fragment, in a girl *æt.* 7; treated by massage and movement, the elbow being kept at first acutely flexed and supported in a sling. The treatment was conducted by her own doctor and district nurse. At the end of 3 weeks she used the arm freely at meals and at play, and at the end of 6 weeks she had practically full range of movements.



FIG. 7.



FIG. 8.

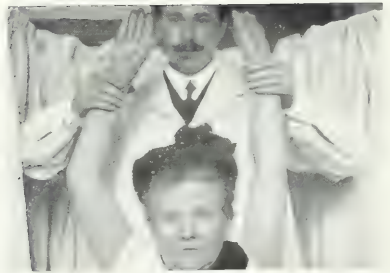


FIG. 9.

Transverse fracture of surgical neck of humerus, fracture of the olecranon process of the ulna with marked separation, and Colles's fracture, all occurring in the right arm of a woman *æt.* 71; treated by massage and movement; sling and body bandage, the elbow being flexed at a right angle; 46 séances spread over a period of 3 months. She began to do light housework 3 weeks after the accident, and was able to do all her housework before dismissal. No compensation. Note the bony union of the olecranon fragments 3 months after the accident.



FIG. 10.

Fracture of the olecranon process with marked separation in a woman æt. 21; treated by massage and movement, the elbow being flexed at a right angle and supported in a sling; 30 séances spread over a period of $5\frac{1}{4}$ weeks. She was never off work as a typist, and was able to perform all her duties $3\frac{1}{2}$ weeks after the accident. There is no deformity, and no limitation of movements; the triceps is well developed and fully acting. This radiogram was taken one year and nine months after the accident, and shows the approximation of the fragments by bony union (Mr. J. M. Graham's case).



FIG. 11.



FIG. 12.



FIG. 13.

Fracture of both bones of the forearm with over-riding of the radial fragments in a girl *æt.* 10. Treatment consisted in massage and movement; a posterior gutter splint of aluminium and a sling. There was union at the end of the second week; splint and sling were discarded at the end of the fourth week; at the end of the fifth week she was using the arm freely; 20 séances spread over 6 weeks. She was never off work as a shop girl. Seven weeks after the accident she was able to perform all her usual work.

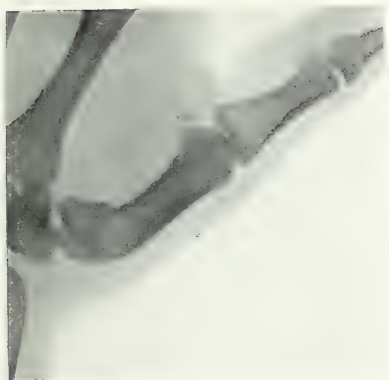


FIG. 14.



FIG. 15.

Bennett's fracture in a man aet. 21; treated by massage and movement. 17 séances; wool and figure of eight bandage. Three weeks after the accident he returned to manual labour, and was able to do military drill with a rifle. No compensation.

From the patient's point of view, viz. comparative comfort during treatment and rapid return of function; from the employer's point of view, viz. short duration of time under compensation; from the surgeon's point of view, viz. good union and full function, this method of treating fractures has proved eminently satisfactory.

My gratitude is due to Mr. Wade and to Mr. Scott Carmichael, the surgeons in charge of the Surgical Out-Patient Department, Royal Infirmary, Edinburgh, for permission to work along these lines and to utilise to the full the cases under their charge.

My grateful thanks are also due to Mr. A. Henderson, former masseur, and to Miss Veitch, masseuse, for the zeal and skill evinced in their work. I am indebted to Dr. Hope Fowler, Electrical Department, Royal Infirmary, Edinburgh, for the radiograms, and to Mr. Frank Pettigrew, Technical Assistant, Surgical Laboratory, Edinburgh University, for printing these.

CONCLUSIONS.

I. Massage and movement should be considered as an *essential* part of the treatment of simple fractures.

II. Since massage allays pain, rapidly removes effusions, and improves nutrition, and since movement of joints prevents adhesions, these procedures cannot be commenced too soon—indeed they are of most service during the *first few days* following the injury.

III. Massage renders reduction and retention in good position easier.

IV. In the upper extremity, deficient anatomical alignment and apposition of fragments is not incompatible with perfect function, and therefore operative interference is seldom indicated in such fractures.

V. The method is exacting in time and skill, but is more comfortable to the patient, and ensures a better and quicker return of function.

VI. The method is one that can be employed by any medical practitioner.

REFERENCES.—¹*Brit. Med. Jour.*, 8th April 1911. ²*Précis du Traitement des Fractures par le Massage et la Mobilisation*, Paris, 1910. ³*Massage in Recent Fractures*, London, 1909 and 1909. ⁴*The Treatment of Fractures by Mobilisation and Massage*, London, 1911.

A STUDY OF THE LOCAL INCIDENCE OF CANCER
IN NAIRNSHIRE.

By C. E. GREEN, F.R.S.E.

IN my recently published paper on the *Local Incidence of Cancer* I sought to show (1) that the lie of the country has a marked effect on the cancer death-rate; and (2) that cancer is due to some product of combustion of coal in Great Britain, and, I should have added, charcoal on the Continent, the two propositions being correlated on the theory that the first affected the proper removal of the products of combustion.

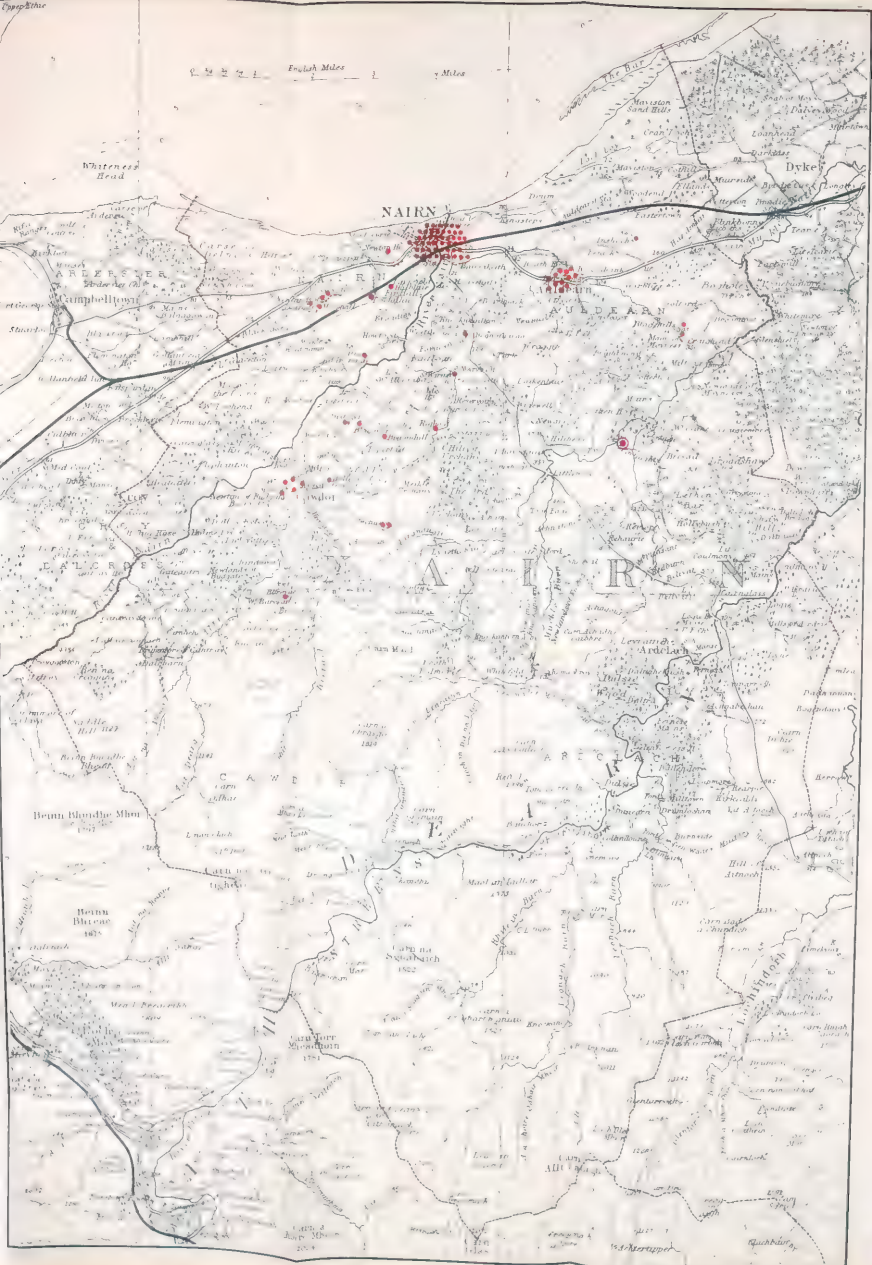
Since my paper was published I have undertaken an investigation which seems to me to furnish strong proof of both propositions. I agree with the statement in a recent editorial note in this Journal that if we are ever to arrive at a solution of the problem of the local incidence of cancer it must be the result of widespread minute local inquiries in amplification of the results of general statistical investigation. In order to confirm and amplify the results which I had previously obtained elsewhere, I was anxious to make a minute investigation of the cancer incidence of Nairnshire for the following three reasons:—

- (1) Because it is shown by the Registrar-General to have the highest death-rate from cancer in Scotland in its rural districts, with a normal death rate in the town.
- (2) Because it contains within its borders all kinds of country—hilly, sloping and flat.
- (3) Because it is almost unique in regard to the fuel used—coal being burned within a mile or two of the railway, and nothing but peat beyond.

This investigation I had the opportunity of carrying out last month by personally going over all the registers of deaths in Nairnshire, noting the individual deaths from cancer for the last ten years, and marking in red on an Ordnance map the place of residence of each sufferer. A copy of this map is annexed.

The county is divided into four registration districts, and the total population is just under 9000. Of this population, as nearly as can be calculated, 5800 is in the town district of Nairn itself, and 1000 each in the three remaining districts of Cawdor, Auldearn and Ardelach.

Now a careful scrutiny of the death registers revealed the surprising facts that the cancer deaths for each of these districts,



including sarcoma and rodent ulcer, for the last ten years are as follows:—

Nairn,	57	cancer deaths out of a total of 1056 from all causes.	
Cawdor,	13	" "	120 "
Auldearn,	15	" "	168 "
Ardelach,	1	" "	105 "

In the Ardelach district, which covers about 100 square miles, therefore, in the last ten years there was only one death from cancer, and that was a rodent ulcer in a patient aged 81.

Even this case was not in the Ardelach district proper, but at Fornightly, on the verge of the Auldearn district. It is marked with a red circle on the map.

The first thing which strikes one in this cancer map of Nairnshire is that although the county has the highest mortality figure from cancer in Scotland—8·77 according to the registrar's figures for 1895, 1896, and 1897; and 9·73, according to Dr. Aitchison Robertson's corrected figures¹—the cancer deaths for the last 10 years are confined to a definite area, and the rest of the county is entirely free.

The second point is the relationship of the lie of the ground to this cancer death-rate. The registration district of the town of Nairn is flat, and lies a little above the sea level. A mile or so inland the ground slopes rapidly up to the 500 or 600 feet level, and it is on this slope and immediately at the foot of it that the highest cancer death-rate occurs—in the two registration districts of Cawdor and Auldearn, which respectively lie on the west and east slopes of this declivity. The Ardelach registration district covers the rest of the entire county, a tract of country of about 100 square miles.

Although the town of Nairn seems to have a high mortality figure from cancer, looking to the number of spots on it, it must be remembered that the bulk of the population is centred there, and that its 57 cancer deaths were out of a total of 1056 from all causes, or a mortality of 1 death in every 19, which is not excessive.

The Cawdor and Auldearn districts, on the other hand, lying on the slope and in the hollow below it, show 28 cancer deaths in the 10 years out of a total of 288 deaths from all causes, which is equal to 1 death in every 10 from all causes—a very high ratio indeed, and almost double that of the flat district. This supports the generalisation which I have previously made in my paper on the *Local Incidence of Cancer*—that on flat sites the cancer death-rate is low, while on sloping sites and in hollows it is high.

The most striking point of all, however, remains. How are we to account for the fact that in this county, which has been shown by statistics to have the highest death-rate from cancer in Scotland, there is a tract of about 100 square miles, mountainous, with houses on slopes and in hollows, inhabited by 1000 people, eating and drinking and smoking in the same way as their immediate neighbours, engaged in much the same pursuits, and yet so free from cancer that the nearest approach to it is one case of rodent ulcer? To my mind, it is explainable on one ground and on one ground only, and that is that its inhabitants burn peat and nothing else.

In the town of Nairn nothing is burned but coal. The Auldearn district is also one in which coal is the fuel used. In Cawdor, coal and, to a slight extent, wood. In the rest of the county peat is abundant, and as no railway traverses it the inhabitants are compelled to rely on the peat bogs.

That the etiology of cancer will ultimately be found to be connected with the fuel question I feel convinced. The disease was unknown in Iceland and the Faroe Islands until coal was introduced; it is to-day unknown in Greenland, where nothing but whale-oil is burned, and, so far as I can find, also in the Lewes, where only peat is burned. Where coal and charcoal are burned it is common. The lesson of this cancer map of Nairn seems to me to be that where coal is burned the cancer death-rate is highest on the slope and in the hollow and lowest on the flat country. Where only peat is burned the disease is really non-existent. I have found the former set of conditions so often that I was not surprised, but I hardly expected the latter to be so convincingly shown.

To enter into a discussion as to why there should be no cancer in a purely peat-burning country would involve opening up an argument on the whole cancer problem, but I cannot resist saying that in my opinion it is due to the fact that, unlike coal, peat contains no sulphur. Scientific agriculture has proved that the tumours which devastate root crops are caused by artificial manures which contain sulphur, and the analogy has its own importance which I have attempted to deal with elsewhere.² Whether this suggestion is correct or not this imperfect study of the local incidence in Nairnshire seems to me to justify the other inferences I have sought to draw from it.

REFERENCES.—¹ *Edin. Med. Journ.*, 1903, vol. i. p. 23. ² *The Cancer Problem*, Edin., 1912, p. 23.

EXTRACTION OF CATARACT IN THE CAPSULE.

By F. F. STROTHER SMITH, Captain, I.M.S.,
Rawalpindi, India.

HAVING just completed a tour of most of the ophthalmic hospitals on the Continent (including Vienna) and in this country, and having seen most of the leading ophthalmologists perform extraction by the capsular method, I wish to discuss here the advisability or inadvisability of surgeons performing extraction in the capsule on the Continent and in this country as a routine method in all patients over 30 years of age.*

At the outset it may be said that extraction in the capsule is a much more difficult operation to perform than the capsule laceration operation. Details in both operations are of great importance, but infinitely more so in extraction in the capsule. In the latter method every detail must be carefully attended to, for any neglect in this respect will almost certainly lead to disaster. I am not going to describe the details of either operation, as that would lead me far beyond the subject of this paper. On the Continent cataract is much more prevalent than in this country, and as a consequence continental ophthalmic surgeons have much more experience of extraction than those who practise in this country. Taking the Vienna hospital, for instance, I should say that, roughly, six times as many cataract extractions are performed there as in a hospital of the same size in this country. My reason for mentioning this point is that the surgeon who only does on the average two extractions a week can never be competent to perform extraction in the capsule unless he has previously had a liberal experience of the method under the supervision of an expert.

Probably two or three a week would represent the ordinary number of cataracts operated on by any one of the leading ophthalmologists in this country, whilst on the Continent eighteen to twenty a week would be about the average.

On the Continent, therefore, extraction in the capsule should be the operation of choice, because there is plenty of material. I am assuming, of course, that the results obtained by this method are far in advance of those obtained by the old method, the

* I may note here that it is inadvisable to attempt this operation on patients under 30 years of age, owing to the toughness of the suspensory ligament. If it is attempted a large escape of vitreous will inevitably ensue, and there is also the possibility of the lens slipping back into the vitreous.

operation being performed by a competent surgeon in both instances. This fact is now beyond dispute, as it has been proved over and over again by statistics which have been published during recent years by many trustworthy ophthalmologists. Since the operation of extraction in the capsule has been perfected by Smith, it is very noticeable that operators by the capsular method have published no detailed long series of their results or of the complications at the time or after operation, such as has been done in the Smith operation.

The operator who contemplates performing the Smith operation should be taught the method by an experienced hand. If the operation is attempted from a written description disastrous results will follow. It is not enough even to see the operation done properly, it must be performed many times by the surgeon himself under the supervision of the expert. It would be quite possible for a good operator by the old method to watch a hundred extractions in the capsule and still be ignorant of how to make the incision or the amount and direction of the pressure to apply to the cornea to dislocate the lens. The direction of the pressure applied to the cornea to dislocate a large soft intumescent lens will be quite different from that applied to dislocate a hard mature lens or an immature one.

At one continental school I was asked to demonstrate extraction in the capsule. At first I refused, owing to the fact that I had not a trained assistant, but under pressure I consented, as the lens seemed a very simple one to dislocate. The operation had been attempted several times previously in this clinic from a written description, but in almost every case a large escape of vitreous occurred. On this account the operation was abandoned. I shall give below the reason for the escape of vitreous in these cases. When I performed the operation everyone present was surprised at the method adopted, as it was not the same as they had attempted or had seen attempted. To take one point. They were in the habit of applying pressure to the cornea by means of the ball of the thumb to dislocate the lens through the lower lid. This, of course, meant that they were simply asking for escape of vitreous, as the patient was able to use his orbicularis freely to exert pressure on the globe. Since my demonstration at that clinic one eminent ophthalmologist has written to me to say that he is going to practise the operation owing to the good results. He was not pleased, however, with the large coloboma, but this is a matter which rests with the surgeon himself; the iridectomy

may be small or large, or may be omitted altogether. It may also be remarked that a patient at that time of life (usually over 45) does not worry much about appearances; all he asks or cares for is good sight. The question of the assistant is a *very* important one in this operation, because the percentage of escapes of vitreous depends on the efficiency of the assistant, provided that the surgeon himself is competent. If the assistant is efficient he should be able thoroughly to control the muscles of both lids and brow so that the patient will be unable to exert any pressure on the globe during operation, no matter how much he tries. The training of the assistant is not a difficult matter provided one can be obtained who will remain for any length of time. In this country the assistant is usually a house-surgeon, whose term of office is limited to six months, so that just as he is becoming efficient he is replaced by a successor and the same training has to begin again; thus the surgeon for the most part would be without a trained assistant. Still more difficult would be his plight with his private patients.

On the Continent, on account of the larger number of extractions, an assistant could become efficient in a much shorter time—perhaps a month. Moreover, that assistant is usually one of the junior surgeons who is available for a large number of years, so that there is not much difficulty. A man who has been shown how to assist can practise it on his colleagues or on a patient in the wards who has sound eyes until he is competent to assist at an extraction in a good patient.

By the old method a surgeon can, as a rule, perform extraction without the aid of anyone except the nurse, which is, of course, a great advantage in this country.

I repeat again that extraction in the capsule is a very risky performance without the aid of a trained assistant, and those surgeons who attempt it will come to grief. I have recently read the opinions of surgeons who have tried the operation and given it up on account of the almost universal escape of vitreous. These opinions are useless except to prove the correctness of the above opinion, because the operation has been attempted from written descriptions and without trained assistance. It is very unfair to the method, and to the patient, for any surgeon to attempt it without previously having been taught by an expert, and also without first having obtained a competent assistant. If surgeons in this country desire to do this operation they must be willing to spend a couple of months under the supervision of an

expert, and during that time perform a good number of extractions in the capsule. I have heard men condemn the operation after seeing only one case done for demonstration purposes. If men wish to learn the operation, or merely to prove for themselves that the operation is that which at present gives the patient the best prospects of good vision, they must go to a clinic where a large number of extractions are performed by this method. They will also learn how to assist, and in turn be competent to train their own assistant afterwards. I have during the past few years had the good fortune to be present at Smith's clinic while surgeons competent at the capsular operation were being initiated into the new method. During that time I had the opportunity of seeing their difficulties, and could appreciate them, as I had had to encounter the same troubles during my own training. I shall not dilate on the difficulties experienced, because, as I have said, written descriptions of this operation are almost useless to the surgeon, unless he is prepared to follow up his reading by a visit to the clinic of an expert. Having done this, he will find that the operation has no terrors for him, and that every step of it is free from difficulty. It is very noticeable how easily young surgeons who have done little or no cataract work become proficient, the reason, of course, being that they have nothing to unlearn.

RECENT LITERATURE.

CRITICAL SUMMARIES AND ABSTRACTS.

MEDICINE.

By W. T. RITCHIE, M.D., F.R.C.P.,
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THE PERCUSSION SOUND AT THE APICES OF THE LUNGS.

THE slight difference in the percussion sound at the two apices consists, according to Fetterolf and Norris (*Amer. Journ. Med. Sci.*, 1912, cxliii. 637), in the fact that on the right side, from the apex down to about the level of the second interspace or the third rib, the note elicited is slightly higher in pitch, shorter in duration, and less resonant: occasionally, also, the note is somewhat more tympanitic in quality. As a result of their anatomical studies, the writers draw the following

conclusions:—(1) The percussion note in the healthy individual is practically always less resonant and higher pitched at the right apex, except in the presence of unusually well-developed left pectoral muscles, and then only if very light percussion be employed. (2) The normal differences are due to the anterior position of the large vessels in relation to the right apex, as compared with the left, to the consequent encroachment upon and reduction in size of the right apex, and to the contact of the inner surface of the right apex with the resonating trachea, while the left is in contact with non-resonating solid tissue.

THE AUSCULTATORY METHOD OF DETERMINING BLOOD-PRESSURE.

The auscultatory method of determining the arterial pressure, described by Korotkow in 1906, consists in constricting the brachial artery above the elbow in the usual manner and in listening over the vessel at the bend of the elbow. According to (Goodman and Howell (*Amer. Journ. Med. Sci.*, 1911, cxlii, 334) the auscultatory phenomena that are heard as the pressure is released may be defined in five phases. First will be heard a loud, clear, snapping tone—the first phase—which is followed by a second phase consisting of a succession of murmurs. The third phase begins with the disappearance of the murmurs and the onset of a tone resembling that of the first phase but less well marked. This tone soon becomes less clear in quality or dull. At this point the fourth phase begins, and is followed by the disappearance of all sounds—the fifth phase. The average extent of the phases in millimetres is—First phase, 14 mm.; second, 20 mm.; third, 5 mm.; fourth, 6 mm. Expressed in terms of percentage based on the pulse pressure (45 mm. Hg) the phases are as follows:—First, 31·1 per cent.; second, 44·4 per cent.; third, 11·1 per cent.; fourth, 13·3 per cent.; or a total of 99·9 per cent. The writers assume that increases in the second and third phases are dependent on cardiac strength and circulatory efficiency, while the first and fourth phases suffer increase when there is cardiac weakness. They recommend that the sum of the second and third phases be compared with that of the first and fourth phases, in order to determine whether the elements of strength (C. S.) or those of weakness (C. W.) are predominating. Their results indicate that with failure of compensation the sum of the first and fourth phases (C. W.) progressively encroaches upon that of the second and third phases (C. S.). In a young subject with a healthy heart and soft arteries, in whom the systolic pressure was 130 and the diastolic pressure 85, the four phases were respectively 31·1 per cent., 44·4 per cent., 11·1 per cent., and 13·3 per cent.; the ratio of cardiac strength (C. S.) to cardiac weakness (C. W.) being 55·5 to 44·4. In a case of mitral stenosis with dyspnoea and cyanosis the phases were 22, 20, 22,

and 36 per cent.: with C. S.:C. W.=42:58. In a case of mitral and tricuspid incompetence with failing heart the figures were 24, 4, 18, and 54 per cent.: with C. S.:C. W.=22:78. Later readings after the patient had improved gave the following figures:—13, 33, 54, and 0 per cent.; with C. S.:C. W.=87:13. In a case of aortic insufficiency, with the pathognomonic sign, namely, absence of the fifth phase, the readings were 15, 3, 56, and 26 per cent.

Blood-pressure estimations are most important in controlling treatment directed to combat high pressure. In cases of hypertension the cardio-vascular system has readjusted itself to altered conditions, so that the appropriate pressure far exceeds the normal pressure in a healthy person. One patient was subjectively at his best when his pressure was 220, and at that pressure the ratio was obtained of C. S.:C. W. =87:3:12:5. When the pressure fell below 220 the ratio of C. S. to C. W. became altered in favour of the latter and the patient did not feel so well. Strong emphasis is laid on the fact that attempts to reduce the pressure below the new physiological limit are not only contra-indicated but are actually harmful: and consequently when cardiac depressor drugs or vaso-dilator measures are employed, the arterial pressure must be constantly watched by means of the sphygmomanometer.

THE INJECTION OF OXYGEN AND OTHER DISINFECTANTS INTO THE INTESTINES THROUGH THE DUODENAL TUBE.

Professor Schmidt of Halle (*Interstate Med. Journ.*, 1912, xix, 587) concludes from experiments made in his clinic that pure oxygen in the interior of the intestine will influence detrimentally the vital activity of the anaerobic bacteria in the bowel, and he considers it possible that morbid processes of decomposition may thus be arrested. In the intestine the absorption of oxygen takes place much more slowly than that of CO₂. In some cases of dyspepsia and intestinal catarrh, especially in conditions involving fermentation of carbohydrates, the injection of oxygen had a surprisingly favourable effect. After a few inflations had been given, starch bacteria had disappeared from the faeces. The writer regards the inflation of oxygen as a valuable addition to our therapeutic methods, especially as we must admit that hitherto our means of disinfecting the intestines have been singularly poor in results. Schmidt employs narrow though stout tubes, the inner diameter of which is 2 mm. The tube is swallowed immediately after breakfast, and during digestion of the meal the tube passes through the pylorus. Thereafter four litres of oxygen may be introduced into the small intestines without causing the patient any sensation of distension. In the course of a few hours the gas will be discharged as flatus.

AURICULAR AND VENTRICULAR FIBRILLATION.

Although *auricular fibrillation* is very frequently observed in the human heart, there are only a few cases on record in which a satisfactory analysis has been made of the heart's mechanism immediately before the onset of the fibrillation. The case reported by Macneill Simpson (*Austral. Med. Gaz.*, 1912, xxxi. 329) is therefore of importance. The patient was a man aged 55 who had previously suffered from acute rheumatism and syphilis, and who had experienced several attacks of dyspnoea and dropsy for five years. He presented the signs of mitral stenosis with loss of cardiac tone: the pulse-rate was 110, with an occasional ventricular extrasystole. Two days later the pulse varied from 66 to 72 per minute, and the ventricular extrasystoles were more frequent than formerly. Subsequently most of the extrasystoles were of auricular origin, and for several days there were many auricular extrasystoles, each one alternating with a normal beat. This condition was the immediate precursor of a persistent auricular fibrillation associated with absolute irregularity of the arterial pulse. The writer draws attention to the fact that as auricular extrasystoles and auricular fibrillation are probably due to the same cause, varying only in degree, the former may furnish valuable evidence of the imminent onset of auricular fibrillation.

Ventricular Fibrillation.—It has long been suspected that sudden and unexpected death may be due to fibrillation of the ventricular muscle, and that this event may supervene as a sequel to auricular fibrillation. In many cases of sudden heart failure the post-mortem examination fails to reveal any definite anatomical cause of the sudden death. No emboli or thrombi can be found in the coronary vessels or elsewhere, and the ventricular muscle is not notably diseased. In such cases it is often assumed that death occurred because the ventricular muscle passed into fibrillar contraction. The comparatively frequent occurrence of sudden death in cases known to have suffered from auricular fibrillation could be explained on the assumption that the fibrillation had spread suddenly from the auricles to the ventricles. Hering (*Monch. med. Wochenschr.*, 2nd April 1912, p. 750) records a case of this nature. The patient, aged 23, had suffered from mitral stenosis and incompetence, combined with aortic incompetence and with auricular fibrillation. The pulse-rate was 134 per minute, and its rhythm was wholly disorderly; the systolic blood-pressure was 115, while the diastolic pressure was 80. The patient was apparently making a satisfactory recovery in the clinic, when one day, while she was sitting quietly on her bed, she suddenly died. The respirations continued for a short time after the heart had apparently ceased to beat. At the post-mortem examination no immediate cause could be found to explain the sudden death. In experimental work death, when

due to ventricular fibrillation, is sudden, for the fibrillating ventricles do not suffice to maintain the circulation of the blood, and the breathing continues after the heart has stopped beating. The clinical picture recorded by Hering is therefore remarkably similar to that observed experimentally.

In experimental work fibrillation of the ventricles usually results in death, yet recovery may occur. August Hoffmann records (*Heart*, 1912, iii. 213) a striking case of paroxysmal tachycardia in a young woman. The mechanism of the heart during a paroxysm was studied by means of the string galvanometer, and it was found that the paroxysm terminated in ventricular fibrillation, after which the heart regained its normal mechanism. An assistant who was feeling the carotid pulse with the finger noticed the end of the paroxysmal attack, and exclaimed "the pulse is gone" at the moment when the galvanometer record showed the ventricles to be in fibrillation. This is the only case on record in which the human ventricles have recovered after having been proved to have been in fibrillation.

LABORATORY TESTS IN THE DIAGNOSIS OF GENERAL PARALYSIS.

McVicar and Gordon Bates (*Canadian Med. Assoc. Journ.*, 1912, ii. 563) report the findings in 46 cases. An analysis of the 38 cases in whom the clinical diagnosis of general paralysis was obvious showed a positive Wassermann reaction in the spinal fluid of all the cases except two, and in the latter there was a doubtful reaction. The blood serum, examined in 25 cases, gave a positive reaction in all except one. The cell count in the spinal fluid was increased in every instance with only one exception. The Noguchi and ammonium sulphate tests for globulin gave similar results in all instances, so that the one test does not appear to be more delicate or less accurate than the other. General paralysis without a positive Wassermann reaction in both blood serum and spinal fluid is rare. A positive reaction may be obtained in the spinal fluid of patients who have had syphilis and who cannot yet be diagnosed clinically as cases of general paralysis.

SURGERY.

By J. W. STRUTHERS, F.R.C.S.,

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DIRECT GASTRODUODENOSCOPY IN AFFECTIONS OF THE STOMACH AND DUODENUM.

ROVSING (*Ann. of Surg.*, August 1912) claims that by his method of direct gastroduodenoscopy during operation an exact diagnosis of lesions in the stomach and duodenum can be made in cases where the

detection of a lesion or the decision as to the nature of an apparent lesion is otherwise difficult.

His gastroscope is an instrument resembling, but twice as large as, a cystoscope, with an attachment by means of which the stomach may be inflated with air after the gastroscope has been introduced. When after inspection and palpation of the stomach the diagnosis is uncertain, a small incision is made midway in the stomach 2 cm. above the greater curvature and just large enough to enable the gastroscope to pass. No purse-string suture is required if the opening is made the right size. As soon as the instrument is passed the stomach is inflated till all creases are effaced, the operating room is darkened, and the lamp is lit. The features of the stomach can then be seen clearly by transillumination in the first instance, followed by direct inspection through the gastroscope.

Tumours show as dark diffuse shadows on the otherwise clear stomach wall. In contrast with this a deep chronic ulcer gives a picture with a porcelain-like centre surrounded by a hyperæmic zone. Small superficial ulcers are revealed by direct inspection, as they do not show on transillumination. If, however, bleeding is going on, these ulcers may show on transillumination as dark spots, while the escaping blood makes a dark stripe on the stomach wall. Abnormalities of the pyloric and cardiac openings can be readily detected. When the stomach has been thoroughly inspected the instrument is pushed on into the duodenum and its first part examined.

Rovsing has found his method of great value in ascertaining the site of ulceration, and warns against drawing conclusions as to the site of ulcers from the character of the pain associated with them. On 12 occasions he has found an ulcer in the duodenum the presence of which was not to be suspected from the symptoms, while he lays particular stress on the danger of diagnosing ulcer from the presence of "inspissation or whitish spots or strings adhering to the serosa," as these manifestations are generally due to causes outside the stomach and duodenum. The method has also proved of great value in detecting the source of hæmorrhage in cases of profuse bleeding from small superficial ulcerations.

Rovsing claims that direct gastroduodenoscopy is of special value in three directions. First, in the numerous cases where the symptoms suggest ulcer but where inspection and palpation of the stomach show nothing of the sort. Here the method removes all doubt, and sometimes shows us that the supposed ulcer does not exist, whereby the patient is spared a senseless and injurious encroachment. Second, for the differential diagnosis between ulcer in the stomach and duodenum. Third, by rendering possible a direct attack on a bleeding ulcer where formerly one had to be content with a gastro-enterostomy because the site of the ulcer was unknown.

THE CONSERVATIVE TREATMENT OF GIANT CELL SARCOMA, WITH
THE STUDY OF BONE TRANSPLANTATION.

Bloodgood has made a careful study of a number of cases of giant-cell sarcoma and reports his results in a well-illustrated paper (*Ann. of Surg.*, August 1912). The evidence which he has collected is considerable in amount, and should go far to remove the doubts of those who hesitate to treat the so-called giant-cell sarcoma as a simple tumour. From his investigations he concludes as follows:—

1. Up to the present time we have no proof that the pure giant-cell sarcoma ever metastasises. It is a question, therefore, whether it should be called a sarcoma.

2. Conservative treatment is justifiable. Curetting should in some localisations of the tumour be the operation of choice, but in those situations where resection in continuity does not interfere with function, resection becomes the operation of choice: for example, upper end of fibula, lower end of ulna.

3. It is justifiable to attempt curetting to preserve function, even when conditions suggest a great probability of recurrence. There is no position where curetting is not justifiable as a first attempt. It has succeeded where the entire lower end of the femur was involved.

4. Among 26 cases subjected to curetting there were five recurrences: one has remained well after a second curetting, three after resection, and one after an amputation.

5. Twenty-one cases were subjected to primary resection: one recurred and was cured by amputation.

6. After curetting or resection the wound should be disinfected with pure carbolic acid followed by alcohol, or chloride of zinc solution. The operation should always be done with a tourniquet, if possible. This procedure is indicated, because in curetting we leave cells and disseminate cells, while in resection we may inadvertently cut into the tumour. There is apparently no danger in recurrences except that they subject the patient to a second operation.

7. It is not necessary to perform bone transplantation at the primary operation unless a single bone like the humerus or femur is divided in its continuity.

8. Bloodgood claims to be the first to recommend and practise direct transplantation into the bone cavity after curetting.

9. He finds that it is simpler, when possible, to get the bone for filling the defect by splitting the bone which has been partly resected, as this can be accomplished through a single wound.

10. In every case in which the X-ray shows a medullary shadow the urine should be examined for Bence-Jones bodies: the latter indicate the presence of a multiple myeloma or metastatic carcinoma.

11. Bloodgood warns against making a positive diagnosis of either

a bone cyst or a giant-cell sarcoma, because the X-ray pictures in these conditions resemble each other very closely except in the later stages.

12. The positive diagnosis must be made at the exploratory incision. The bone cyst as a rule can be recognised by its blood-stained contents, the giant-cell sarcoma by its red vascular tissue, which looks like granulation tissue. Confusion may, however, arise, and in cases of doubt a frozen section should be made.

In his study of benign bone cysts, osteitis fibrosa, and giant-cell sarcoma, Bloodgood has been forced to the conclusion that there may be some relation between these pathological processes. In bone cysts and osteitis fibrosa currant-jelly areas are found which cannot be told under the microscope from the giant-cell tumour, and in the latter we often find white areas histologically identical with osteitis fibrosa. The term "giant-cell sarcoma" ought, according to Bloodgood, to be dropped, and the expression "giant-cell tumour" be used in its stead.

THE PROBLEM OF COVERING DEFECTS IN THE SKULL.

Röpke (*Centralbl. f. Chirurg.*, No. 35, 1912) suggests the transplantation of a piece of the scapula in order to cover a defect in the skull, and reports a case in which he successfully used this plan.

The patient had a gap in the frontal bone measuring an inch by an inch and a half following a compound fracture. Two months after the injury, when the wound was healed, the gap in the frontal bone was exposed, the edges freshened, and the scar tissue dissected away. The vertebral border of the scapula was then exposed, the subscapularis muscle pushed aside towards the axillary border, and a piece cut out of the scapula corresponding to the gap in the frontal bone, the subscapularis being detached as this was done. The transplanted portion healed in well and afforded good protection, while the function of the arm was in no way interfered with by the procedure.

OBSTETRICS AND GYNECOLOGY.

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TREATMENT OF UTERINE FIBROMYOMATA WITH X-RAYS.

If the forecasts of the German observers at present working at the X-ray treatment of fibroids prove correct, all operative treatment will soon be a thing of the past. In certain clinics in Germany every case

of fibroid is being treated with X-rays, and there will soon be sufficient material collected on which to base conclusions regarding the results. The papers so far published seem to show that the treatment is most successful so far as arrest of hæmorrhage is concerned. At the meeting of the Deutsche Gesellschaft für Gynäkologie last year a discussion on the subject took place. Gauss (*Verhand. d. Deutsch. Gesell. f. Gynök.*, 1911) gave his experience in the Freiburg Klinik, and showed that all hæmorrhage could be stopped after treatment extending over 2 to 3 months. Heynemann (Halle), Menge (Heidelberg), Sellheim (Tübingen) and others had had a similar experience. In France good results are reported by Meyer (*Thèse de Paris*, 1911, No. 331) and by Guilleminot (abstract in *La Gynéc.*, February 1912, p. 120).

The treatment is based upon the effects produced on the ovary when it is exposed to the rays. It has been shown by several observers, among them Reifferscheid (*Verhand. d. Deutsch. Gesell. f. Gynök.*, 1911), that when exposed to X-rays the follicles of the ovary undergo extensive degeneration and the ova are destroyed. This results in sterility. In addition, the cells of the corpora lutea are destroyed and the ströma altered so that the internal secretion fails, and the result is the establishment of an artificial menopause. If the exposure to the rays has been long enough this result is permanent. After shorter exposures some of the cells may escape destruction and later may again carry on their functions.

Information is given by the various writers regarding the practical details of the applications. The chief points are that the tube used should be a hard one, and that a filter of glass or of aluminium be employed. Several cases of severe X-ray burns have been recorded. These are specially liable to occur in women with fat abdominal walls (Desplats, *Journ. des sci. med. de Lille*, April 1912). The number of applications varies in different cases. As a general rule women near the age of the natural menopause require fewer than younger women. An application every 2 to 3 weeks and repeated from 3 to 6 times is in most cases sufficient. In addition to the arrest of hæmorrhage there has been observed in many cases a marked diminution in the size of the tumour. At the same time the patient suffers from none of the acute symptoms of the artificial menopause.

The treatment is equally good in uterine hæmorrhage from other causes. In young women with menorrhagia short applications have resulted in a marked diminution of the blood loss. In women near the menopause suffering from fibrosis uteri with its attendant floodings the menopause can be at once established and all bleeding arrested. The same results have been obtained in excessive menstruation due to inflammatory conditions of the tubes and ovaries and at the same time a diminution in the size of the inflamed organs has been noted.

So far as published results go, the effect of X-rays in stopping

hemorrhage from the uterus seems to be established. Sufficient time has not elapsed to show what the behaviour of the fibroid tumours will be some time after. We now recognise that it is just at or after the menopause that fibroids are most liable to undergo degenerative changes, such as necrobiosis, cystic degeneration, etc.—conditions which very often call for immediate operative treatment. Then, again, there is the possibility of sarcoma developing. Submucous fibroids giving rise to intermenstrual hemorrhage are not affected by the treatment, and for them an operation must be done.

LIGATION AND EXCISION OF THE PELVIC VEINS IN CASES OF PUERPERAL THROMBO-PHLEBITIS.

Since Trendelenburg in 1907 directed attention to the occurrence of thrombo-phlebitis as a common form of puerperal sepsis, and to the possibility of its treatment surgically, evidence has been gradually accumulating which bears out the views he then expressed. The frequency of the condition is variously estimated, but taking all statistics available, it would appear that about one-third of all cases of puerperal sepsis assume this form. Miller and Huggins in two independent communications to the section on Obstetrics and Gynecology of the American Medical Association in June of this year (*Journ. of the Amer. Med. Assoc.*, lix, No. 3) sum up the situation, so far as this can be done, from their personal experience and a study of published cases which now number 110.

The chief difficulty in these cases is the uncertainty of the diagnosis, but when it is remembered that post-mortem examinations show that one-third of all cases of puerperal infection are of this type, there should be less hesitancy in making the diagnosis than has hitherto been the case. The symptoms as a rule begin several days after the confinement, and are characterised by frequently recurring rigors, with high temperature and rapid pulse. The patient in the intervals is fairly comfortable, and the temperature and pulse practically normal. Local signs may or may not be present. As a rule after a few days there is a palpable thickening and some tenderness in the outer part of one or both broad ligaments, and there may be thickening and tenderness along the line of the ovarian vein. Blood examination may show the presence of organisms or it may be negative. The absence of pelvic effusion or other gross lesion is in favour of the presence of a septic thrombosis. The vein usually affected is the ovarian on one or on both sides, but the uterine veins may also be involved.

The mortality in untreated cases is high, and varies, according to different observers, from 50 to 95 per cent. This mortality has been considerably reduced in operated cases. The condition is more or less analogous to lateral sinus thrombosis in cases of ear suppuration, and

the success which has attended the clearing out of the sinus and the ligation or excision of the jugular vein encourages the hope that similar treatment applied to the pelvic veins may be equally beneficial. Huggins advises exploratory laparotomy in all suspected cases. He points out that these puerperal cases stand the operation well, and even if nothing can be done their chances of recovery are not prejudiced. The transperitoneal route is the best, as the exact condition of affairs can be seen, and there is less chance of such an accident as ligating the ureter along with the vein. If the ovarian vein only is involved it may be merely ligated above the thrombosed part or ligated above and below and completely excised. If the other pelvic veins are involved they must be similarly dealt with. Statistics show, however, that when this has to be done the prognosis is by no means so favourable. If the cases are diagnosed and operated upon early the results are distinctly good. An analysis of cases operated on in America by, among others, Williams, Vineberg, and Huggins, shows a total of 16 cases with 5 deaths. These figures are sufficiently good to show that in the present state of our knowledge surgical interference offers the best hope of recovery.

TREATMENT OF CASES OF PREGNANCY COMPLICATING PULMONARY TUBERCULOSIS.

At the recent Congress on Tuberculosis at Rome and at the meeting of the German Gynecological Congress of 1911 very decided opinions were expressed by the German obstetricians as to the best treatment for women affected with pulmonary phthisis and at the same time pregnant. Men of such experience as Bumm, Martin, v. Bardeleben, Dutzmann, and Schauta (*Verhand. d. Deutsch. Gesell. f. Gynäk.*, 1911) advocate strongly the induction of abortion in the early months in cases where the disease in the lung is active. In the later months total extirpation of the uterus and adnexa is practised by some and permanent sterilisation of the mother by excision of the tubes by others. Gauss puts in a plea for temporary sterilisation by means of X-rays. Against these somewhat extreme measures Pinard (*Ann. de gynéc. et d'obstét.*, June 1912) enters a protest.

He examines the subject from three sides—1. The influence of gestation on the tuberculous process. 2. The influence of phthisis on gestation, and 3. The future of the child born of the tuberculous mother.

1. *The Influence of Gestation on the Tuberculous Process.*—Pinard has collected the statistics of the Baudelocque clinic, and finds that out of 71,225 confinements there were only 26 deaths from pulmonary tubercle in the puerperium. He has seen cases where the lung disease progressed rapidly during pregnancy, cases where it remained stationary through

successive pregnancies, and cases where there was actual improvement during the gestation. He quotes Bar, who, speaking at the Rome Congress, said that about 60 or 70 per cent. of women with slight pulmonary tubercle improved during the gestation. With this conclusion Pinard agrees.

2. *The influence of pulmonary tubercle on gestation* is not such a disputed point. Clinical experience and experimental evidence all go to show that as a rule the gestation goes to term and that abortion is relatively infrequent.

3. *The Future of the Child Born of the Tuberculous Mother.*—It has been definitely proved that the tubercle bacillus can be directly transferred from mother to child through the placenta. This phenomenon is, however, so rare that its possibility should not influence us in the discussion of this subject. At the same time Pinard considers it well to practise immediate ligation of the cord in all infants born of tuberculous mothers, as Landouzy advises. Apart from direct transmission *in utero*, the inheritance of the tuberculous diathesis is, in Pinard's opinion, no reason for the sacrifice of the unborn child. In his forty years' experience he has seen too many children born in the above circumstances who have developed into healthy men and women to justify him in any such procedure.

For all these reasons Pinard considers the induction of abortion in the early months unjustifiable, and still more so the various surgical procedures advocated by the German obstetricians. A so-called therapeutic abortion can only be justified if it can be shown that it has certainly preserved the life of the mother which otherwise would have been lost. He contents himself with treating the tubercle by every means at his disposal, and only terminates the pregnancy if in the later months the mother is obviously losing ground rapidly.

THE TIME TO OPERATE IN TUBAL PREGNANCY.

Discussions on this subject are still taking place, and surgeons do not seem to be any nearer an agreement. The ideal time to operate is of course before rupture has occurred. It is only in a small proportion of cases, however, that the patient is seen by the surgeon until after the accident has happened. If rupture has occurred with extensive intra peritoneal hemorrhage, is operation to be undertaken immediately or ought it to be delayed until the shock has passed off? Marvel (*Amer. Journ. of Obstet.*, January 1912) has analysed his cases of tubal pregnancy from this point of view. He had 24 cases in all. One died of hemorrhage before operation could be undertaken. In six cases the patient was not seen until from two to three days after the primary rupture, and in the interval they had had symptoms pointing to subsequent bleeding. All six were in a state of extreme collapse when

admitted to hospital and were operated on immediately. All recovered. In a group of 16 cases the operation was not undertaken until from two to six weeks after rupture, the patients having been treated in the interval by rest. In all of these the operation was difficult, owing to the presence of adhesions and in some owing to the presence of inflammation with pus formation. From the analysis of these cases Marvel holds that operation ought to be immediate. If the bleeding is once controlled, shock can be remedied by saline transfusion and vasomotor stimulation. Stillwagon (*Amer. Journ. of Obstet.*, January 1912) comes to the same conclusion. He also has recently had a case where the patient died of hæmorrhage before he saw her.

INFECTIOUS DISEASES. .

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MOSER'S SERUM IN SCARLET FEVER.

SZEKERES (*Wien. klin. Wochenschr.*, 13th June 1912) reports a series of 16 cases of scarlatina treated with Moser's serum in Bokay's clinic. It appears that Bokay adopts the view that the specific infection of scarlatina is due to a streptococcus, and he has already reported favourable results with this serum. Szekeres admits that enthusiasm in Germany has declined, but quotes various Russian and Polish authors in favour of this method of treatment. His own cases were selected from 130 patients suffering from the disease, and were chosen apparently for their severity, only serious infections being dealt with. Eight were boys and eight girls, and their ages varied from one to fourteen years. The serum used was a polyvalent antistreptococcic one, prepared according to Moser's method by Paltauf. The dose employed was in most cases 200 c.c., only two of the 16 patients receiving 150 c.c. The injection was given on the day of admission to hospital and in the majority of instances on either the 3rd or 4th day of illness. Improvement was most apparent in those patients who suffered from a pure intoxication without faucial ulceration. It does not appear, however, that these cases were of the type described as "toxic" in this country. Nevertheless the favourable effects of the serum certainly suggest that it has some antitoxic qualities in relation to the undetermined scarlet fever organism, as these cases can hardly have been affected by superadded septic infection. The good results obtained in the other patients, however, could doubtless be explained by assuming that the severe throat symptoms were due to ordinary streptococcal infection. Yet it is definitely stated that in those patients who

presented varying degrees of ulceration improvement was not so rapid, and, instead of being observed in 12 hours after injection, it was often postponed for 3 or 4 days.

The case for the serum seems to be slightly weakened by the fact that there did not appear to be much difference in the ultimate results according to the day of illness on which the injection was given. Those patients whose treatment commenced on any of the first three days of illness did equally well, those injected as late as the fourth day took somewhat longer to recover. Such results afford a most striking contrast to the behaviour of antidiphtheritic serum, the specific value of which is universally recognised.

The effect of the injections on the temperature level were well marked in all cases. The fall, however, in the "septic" type of cases was only slight at first. With the fall of the temperature the general condition and the subjective symptoms of the patient showed distinct improvement, manifested particularly by the disappearance of the toxic symptoms, by the alteration of the mental state, and by the strengthening of the heart's action. Only one patient for instance required stimulation. The rash was also affected, lasting a shorter time, being favourably modified in colour and character, and in one patient being checked in its full development, the limbs being left unaffected by it. The action of the serum on the throat, however, appeared less satisfactory, and the inflammation persisted from 7 to 12 days. In one patient the throat symptoms were more pronounced after injection, in the others if the ulceration was not improved it did not, at any rate, spread.

The small number of patients treated did not allow Szekeres to determine whether complications were less frequent or not. Four cases of nephritis, three of suppurative adenitis, and one of arthritis occurred. There was no death in the series.

Observations on the prophylactic value of the serum were also made, and an account is given of two series of protective injections. On the first occasion during a severe scarlet fever outbreak 18 exposed children were injected, with the result that only two took the disease, one of whom, however, died. More details are given regarding a second series of cases. In five adjacent houses on a farm, out of 95 children 33 had taken scarlet fever and five had died. At the time the injections were given there were 12 acute cases of less than one week's standing, the outbreak having shown no signs of abating. It was only in houses in which cases had recently occurred that the injections were given, 22 children being treated, and all these escaped infection. The dose employed was from 15 to 20 c.c. The injected children were in most intimate contact with the patients, some occupying the same bed. Even allowing for the uncertainty of scarlet fever infection, and for the fact that these children must have been exposed to a considerable

extent before treatment without contracting the fever, these results are certainly encouraging.

MILNE'S INUNCTION TREATMENT OF SCARLET FEVER.

Such general interest has been aroused by the reported benefits of this method that an account of a careful trial of it by Turner (*Metropolitan Asylums Board Reports*, 1911) is of particular value. With a view of testing the protection afforded by the eucalyptus oil inunction he set aside first a ward of 10 beds and shortly afterwards a larger one of 20 beds in which were placed all the cases notified scarlet fever which appeared doubtful on admission. Many of these turned out to be true scarlet fever cases, and they remained in close association with those in whom no evidence of the disease could be found. Later, ordinary unselected cases of the fever were also admitted to the ward, in which all patients were subjected to Milne's treatment. A second ward under the charge of Dr. Lakin was subsequently utilised so as to increase the field of observation.

Turner also employed the inunction treatment for cases of scarlet fever which developed in the diphtheria wards, the patients being left without isolation among those suffering from diphtheria.

The results are at once inconclusive and suggestive. In the first place the protection afforded by the method was by no means complete. In the first scarlet fever ward were treated 141 certain cases of scarlet fever, 20 doubtful, but probably mild, cases of scarlet fever, and 40 cases which were certainly not scarlet fever. In the second ward were treated 105 true cases of scarlet fever, 7 doubtful cases, and 14 cases which were not scarlet fever. In these two wards 6 of the non-scarlet cases contracted the fever out of 57 patients who did not have it on admission. This gives a percentage rate of 10·5 as against 6·5 for patients isolated under the old method in single rooms. Turner regards the difference as so slight as to make it worth while continuing the experiment with modifications. He repeats that the immunity from risk in the diphtheria wards was by no means complete. While one child treated by Milne's method remained in the diphtheria wards for 2½ months without infecting anyone, a second child contracted the fever from a cause otherwise unexplained after exposure for over a month. Turner appears to be very doubtful if the infection was contracted from the first case in this instance, but he does not bring forward any evidence to the contrary. In any case the infected child, duly oiled, remained in the ward, and 4 subsequent cases occurred on the 9th, 10th, and 11th days of her illness. It is to be noted that these were isolated, which does not show confidence in the method.

To return to the scarlet fever patients, "return cases" were as numerous after their discharge home as the usual hospital average. This fact throws grave doubt on the efficacy of the treatment. Con-

trary to Milne's assertions Turner noticed no modification in severity and no diminution in the incidence of complications. There were 5 deaths in 194 cases—a low, but not unusual, hospital percentage. The detention in hospital was certainly shorter than the average—44·5 as against 57·4 days—with a similar leakage of infection as judged by “return cases.” The treatment therefore might be regarded as economical if it were not the fact that many hospitals show an even shorter detention with comparable results, although Milne's method is not employed.

Turner, after stating his facts and giving statistical tables, gives his own opinion. He points out that the absolute immunity claimed by Milne was not obtained. He says that the fact that 51 out of 57 patients exposed to infection escaped is a striking one, but regards it as not improbable that similar results might be obtained even if the method was not employed.

This last suggestion caused me to look up our Edinburgh City Hospital records for the last two years, and I find that of 23 cases who were treated in the ordinary wards for at least 3 weeks, but who ultimately proved not to be scarlet fever, only 2 contracted the disease—approximately 8·7 as against Turner's 10·5. I am of course prepared to admit the number is too small for a perfectly fair comparison, but it is at least suggestive. I may add that of 30 cases of the same doubtful description on admission, which were finally diagnosed “not scarlet fever,” and which were treated in siderooms attached to the general scarlet wards and nursed by the ordinary scarlet fever nurses not one took the infection. I would like to attribute this immunity to the excellence of the nursing, but it is not improbable that it is largely due to the fact that scarlet fever is not nearly so infectious a disease as is usually taught. And it may be added that in the face of the admitted susceptibility to scarlet fever shown by diphtheria convalescents, it is not at all unusual for a desquamating scarlet fever case to be found in a diphtheria ward, where it has lain for several weeks without causing infection. We cannot, moreover, explain the striking results obtained by hospitals which have cut down the detention of scarlet fever patients to four or five weeks, without revising our views on the subject of the infectivity of the disease.

Turner's paper is especially welcome as a judicial and impartial statement of facts regarding a very interesting and difficult question.

TETANUS AND THE DIPHTHERIA BACILLUS.

Bitot and Mauriac (*Gaz. des Hôp.*, 2nd May 1912) record a case of what they term “spasmogenic diphtheria.” They allude to cases of tetanic spasm associated with the presence of the diphtheria bacillus reported by various observers, and state that Daure (*Thèse de Bordeaux*,

1912) has been able to collect 15 observations from the literature. Their own case is extremely interesting. A man of 56, previously healthy, and employed as an agricultural labourer, was attacked by trismus accompanied by faintness and general stiffness on the 18th October. Opisthotonos followed. Spasms of a tetanic nature occurred frequently, up to 72 in the 24 hours. It was difficult to feed him, and he became even worse on the 26th, when he was injected with antitetanic serum and given large doses of morphine and chloral without effect. No false membranes were at any time visible in the throat. The suggestion of tetanus was accentuated by the fact that he had received a punctured wound in the foot 15 days before his first symptom. Removed on the 6th November to Bitot's wards in the St. André Hospital, he was again given antitetanic serum by the resident. He presented all the signs of a severe attack of tetanus, and was so rigid that he could be supported by two chairs placed under his occiput and heels, and this was possible even in the intervals between his actual spasms. As a result of an examination of the nasal mucus and of the saliva which were found to contain diphtheria bacilli, treatment with antidiphtheritic serum was commenced on the 9th November. He was somewhat better next day, and the injection was repeated. The improvement was still more marked on the 11th, the spasms being less frequent. The injections were continued until he had had 6, 20 c.c. being the dose on each occasion. By the 15th he was moving easily in bed, and he was able to walk on the 18th, leaving hospital a month later completely cured, and giving negative cultures.

In this case the improvement cannot be attributed to the mere effects of horse serum, as he had got worse in spite of the antitetanic serum. The immediate amelioration of his symptoms after diphtheria antitoxin was very striking, and the other cases reported in the literature being considered, it really seems probable that the tetanic spasms were due to the diphtheria bacillus.

PATHOLOGY.

By THEODORE SHENNAN, M.D., F.R.C.S.,
Pathologist, Royal Infirmary, Edinburgh.

CULTIVATION OF LIVING TISSUES IN VITRO.

R. G. HARRISON (*Proc. Soc. Exp. Biol. and Med.*, 1907, iv. 140) seems to have been the first to attempt to grow living tissues outside the body. He suspended portions of young frog embryos in a hanging drop of frog-lymph. Shortly after adding the tissue to it the lymph coagulates spontaneously. By this method Harrison demonstrated

in a striking manner the development of the embryonic central nervous system, muscle, and skin. The axis cylinders developed independently from the protoplasm of the neuroblasts.

M. T. Burrows (Cornell University) modified Harrison's methods, employing blood plasma in place of the lymph. He repeated successfully Harrison's experiments, but, further, succeeded in growing chicken embryos in hen plasma, and found, moreover, that the functional activity of such tissues persists for a long time. For example, the heart of a 60-hour chick embryo retains its rhythmic contractility for 8 days.

Proceeding further, Burrows and Carrel succeeded in cultivating portions of organs and tissues of adult animals. The growth of malignant tumours of the mouse, the rat, and of man were studied by the same means. Other observers found that tissues can grow in foreign plasma from other animals, and even in saline solution. The cells frequently show amoeboid movement.

Working on similar lines, E. S. Ruth has studied the cicatrization of wounds (*Journ. Exp. Med.*, 1911, xiii. 422), R. A. Lambert the production of foreign body giant-cells (*Journ. Exp. Med.*, 1912, xv. 510), and Carrel and Ingebrigtsen the production of antibodies by tissues living outside the organism (*Journ. Exp. Med.*, 1912, xv. 287). The greater number of the papers bearing on this novel and interesting method of investigating living tissues have appeared in the *Journal of Experimental Medicine*, New York.

Burrows, in his most recent apparatus, can cultivate larger quantities of tissue, as he provides for the renewal of the nutrient fluid, and the tissues live longer—even up to 30 days. The apparatus is of the nature of a warm stage. The cultivation chamber has a cover-glass, to which are fastened fibres of cotton-wool so as to form a capillary network. The tissue is cut up into minute pieces and laid in the meshes of the network. It is then covered with fresh plasma which coagulates, thus fixing the pieces of tissue, so that they are not displaced by the circulating culture medium. By this method Burrows has cultivated heart muscle cells and observed their rhythmic contraction *in vitro* (*Monch. med. Wochenschr.*, 1912, No. 27, S. 1473). Hearts of chick embryos in all stages of development were employed. The whole heart of a 60- to 96-hour embryo pulsates rhythmically—in culture—with a frequency of 50 to 150 beats per minute. The contractility of excised portions of the heart depends on the age of the embryo and on the region of the heart from which they are taken. Portions of *ventricles* of 60-hour to 10-day embryos, portions of *auricles*, especially from the neighbourhood of the veins of embryos of suitable ages and of young chicks, contract rhythmically. Portions of the ventricles from older embryos do not pulsate regularly. The portions of auricles pulsate more rapidly (150 to 220 times per minute) than the portions

of ventricles (50 to 150). The rhythm in hanging drop cultivations remains regular to the 3rd or 4th day, and then continues intermittently to the 17th day. In the larger cultures in which the plasma is renewed the rhythm remains regular up to the 30th day.

Proliferative Changes.—Many cells of the original piece of tissue emigrate rapidly into the surrounding fluid, and then these cells proceed to undergo proliferation and become differentiated. By suitable means they can be identified to be heart muscle cells. Later these cells, separated from the original tissue, or joined together in a syncytium, commence to contract rhythmically, in one case on the fifth day, in other cases on the fourteenth day. Proliferative changes could be detected even as late as the thirtieth day. The phase of contraction of the cells lasts longer than that of relaxation. The author maintains that these investigations support the myogenic theory of the transmission of the heart beat.

Employing somewhat similar methods, Hanes and Lambert have studied the amoeboid movements of cancer cells as a factor in the invasive and metastatic development of malignant tumours (*Virch. Archiv.*, 1912, Bd. ccix. H. 1, S. 12). From investigation of the growth *in vitro* of transplantable tumours of mice and rats, these authors believe that tumour cells penetrate the surrounding tissues in virtue of their independent amoeboid movements.

The authors' method of growing the tissues of warm-blooded animals *in vitro* is simple. Blood from an artery or vein is allowed to fall into a paraffined test-tube standing in ice, and immediately centrifugalised. The clear plasma is conveyed by means of a paraffined pipette into another cold paraffined test-tube. The plasma may be kept for hours or even days. A drop of the plasma is placed on a cover glass and a small piece (0.5 to 1 c.mm.) of tissue placed in it. The cover-glass is then inverted rapidly on to a hollow ground slide, and sealed with paraffin or with vaseline. The plasma coagulates rapidly and then the preparation is placed in the incubator at 37° C. The tissue begins to grow in 6 to 18 hours. The cells wander out into the surrounding medium, undergo brisk karyokinesis, and divide up, absorbing nourishment from the plasma. Rat sarcoma cells wander out singly or in loose chains, and become scattered irregularly in the fibrin network. Carcinoma cells tend, on the contrary, to remain hanging together in longer or shorter rows, the edges of which display numerous irregular pseudopodia. Only occasionally does one see single carcinoma cells wandering out into the plasma.

The authors believe that by a similar method of development cancer spreads locally, and also makes its way into lymph or blood channels, in which cells or groups of cells may be carried off to form metastatic growths. The authors do not, however, seem to be altogether sure of their ground, but nevertheless the theory is an

interesting one, which may prove to be of use in settling this question.

BONE-MARROW IN THE HILUM OF THE KIDNEY.

Tanaka (*Ziegler's Beiträge*, 1912, Bd. liii. H. 2, S. 338) describes two cases of splenic anemia (anemia pseudo-leukemica infantum) in which bone-marrow had developed within the hilum of the kidney.

The first case was that of a male child who died at the age of $1\frac{3}{4}$ years. Five months before death a blood count gave 8000 leucocytes, 4,000,000 red blood corpuscles, and 60 per cent. haemoglobin. There was very marked rickets, also great enlargement of the liver, and extreme splenomegaly. The lymph glands were enlarged. The immediate cause of death was acute broncho-pneumonia. At the post-mortem examination the spleen on section was reddish-grey, with numerous lighter points—the Malpighian bodies. Between the substance of the kidney and the renal pelvis there was light brownish-red, jelly-like tissue resembling bone-marrow. The femoral bone-marrow was dark reddish-brown, and the medullary cavity was invaded by sclerotic tissue resembling callus.

Microscopically, the tissue in the renal pelvis contained few fat-cells, but many myeloblasts, some showing mitosis; also nucleated red corpuscles, the nuclei of some showing mitosis: numerous neutrophil and eosinophil myelocytes, lymphocytes, and here and there bone-marrow giant-cells. The cortex and medulla of the kidney showed no important pathological changes: only in the former were there small foci of cellular infiltration, consisting of lymphocytes, myeloblasts, a few eosinophil myelocytes, and rarely bone-marrow giant cells.

The second case was that of a 2-year-old female child, who suffered from severe rickets, splenomegaly with anemia, and who died from hypostatic pneumonia.

The lymphatic glands in the neck and at the roots of the lungs were enlarged and of a dark red colour. The spleen was enlarged, soft, uniformly bright red, the Malpighian bodies not prominent. Both kidneys were large, pale, and firm. The bone-marrow was of a brownish colour. In the mucous membrane of the renal pelvis and in the connective tissue within the hilum of the kidneys there were both diffuse and circumscribed small collections of cells, some contained within capillaries, most free in the connective tissue. The collections were made up of myeloblasts, lymphocytes, polynuclear leucocytes, and nucleated red corpuscles. Some of the myeloblasts showed mitosis of their nuclei. Other foci contained normoblasts and a few megaloblasts. There was no infiltration of cells in cortex or medulla. The spleen, microscopically, was not greatly changed.

The author believes that the condition had originated with a hemorrhage into the tissue of the hilum, whereby the bone-marrow elements,

which had been circulating in the blood-stream, and which possess marked proliferative powers, escaped into the tissue and there began an independent energetic development, as indicated by the presence of numerous mitoses; further, they look on the process as compensatory for the failure of the hæmopoietic functions of the normal bone-marrow.

DETECTION OF OVA OF ANIMAL PARASITES IN FÆCES.

Yaoita (Tokio) recommends the following procedure for concentrating the ova of animal parasites in fæces (*Deutsch. med. Wochenschr.*, 1912, No. 33, S. 1540):—A pea-sized portion is taken from five different parts of the fæces. These are shaken up in a test-tube with about 10 to 15 c.cm. of a mixture of equal parts of ether and 25 per cent. antiformin. If the fæces are hard, the portions taken are in the first place broken up in the antiformin with the aid of a glass rod, and then the ether is added. The resulting fluid is filtered through a layer of stretched gauze and then centrifugalisised for a minute. Four layers form in the centrifuge tube, the lowest of which—of comparatively small thickness—contains the insoluble constituents of the fæces and any parasitic ova which may be present. These are affected only slightly, or not at all, by the reagents employed.

If the sediment is abundant, several c.cm. of dilute hydrochloric acid should be added to it, the mixture shaken thoroughly, and then again centrifugalisised.

PUBLIC HEALTH.

By WM. ROBERTSON, M.D., D.P.H.,
Medical Officer of Health, Leith.

THE question uppermost in the mind of health authorities at the present time has reference to the National Health Insurance Act. More especially of course is this interest centred in the demands made for suitable provision for those suffering from tuberculosis in one or other of its forms.

Not long ago the Local Government Board, figuratively speaking, set the heather on fire by the issue of a memorandum containing far-reaching recommendations upon which administrative action was to be based. Thereupon, with extraordinary haste, medical officers of health were almost forced to draw up reports upon the subject for the guidance of their respective local authorities. It was made to appear as if the control of tuberculosis had suddenly become acutely urgent. In those districts where scant attention had been paid to what one might term spade work the local authorities were suddenly roused from their lethargy and their past inaction brought into bold relief.

With January 1913 as the beacon ahead there was feverish haste and bustle—the activity in spending being left to follow. Literally translated, it proved that too much had been expected from mere notification. In too many instances responsible officials had waited with folded arms to see what effects would result from notification. On the other hand, where efforts had been made to provide administrative machinery in the form of sanatoria, dispensaries, and special officers, the Insurance Act bombshell caused little or no consternation.

One is struck with the far-reaching demands now being made upon local authorities by medical officers of health. It would almost appear as if tuberculosis was a disease that had suddenly sprung into existence and one calling for wholesale isolation. As a matter of fact the scourge is gradually declining in its incidence, this decline being most marked where municipal authorities have been zealous in relation to providing better housing and healthier environment for their citizens. The trend of opinion, based upon experience, is that domiciliary treatment, especially of pulmonary tuberculosis, will become more common as time goes on. The advent of tuberculin has changed the complexion of treatment. There may be those who doubt that proposition. It is nevertheless true, and its truth has been proved where tuberculin has been used by competent persons in suitable cases.

Among early cases of pulmonary tuberculosis, recognised as such, only a small proportion will be compelled to resort to a sanatorium. At the dispensary tuberculin will be exhibited in graduated doses, as is being done in several centres with marked success. Since the dispensary system was initiated at Leith, and with it the use of tuberculin made a practice, the tax upon the beds at the sanatorium has never been acute. This could not be said in the pre-tuberculin days. It is quite common now to have men and women receiving treatment at the dispensary without being compelled to leave work for a single day. With the aid of tuberculin, given, as has been indicated, in graduated doses, patients increase in weight, regain strength, and improve in their physical condition. This is no myth begotten of enthusiasm, but a real truth which can be demonstrated with convincing examples. Tuberculin has been carelessly cast aside too long, but its time is coming, and when its value is recognised and its employment practised by those who have studied its powers and limitations, those who have been advising immense sanatoria will realise that they have struck too high a note of requirements. There is no gainsaying the fact that when dispensaries, sanatoria, and specially delegated officers are in active operation, a tight net will be wound round tuberculosis. The school medical officer must not be forgotten as an active ally. In Leith the school medical officer (Dr. Walker) supplies a constant stream of "suspected" scholars to the dispensary. Doubtful cases are drafted to the sanatorium, where ten days are

spent while test doses of tuberculin are administered. Positive cases, unless the home surroundings are very unsatisfactory, are sent home, the dispensary being visited bi-weekly there to receive tuberculin.

As has already been said, tuberculin has relieved the strain upon the beds set aside for pulmonary tuberculosis. It has also enabled us to curtail the period of residence in the sanatorium, because improving patients will maintain their improvement at home if they are taking tuberculin well.

The more one observes the benefits accruing from the employment of this remedy, the more does one marvel at the diffidence exhibited when its praises are sung.

If the tuberculosis officers about to be appointed are to be a success, they should work in very close relationship with the medical officer of health. Also to be of real value these officials must not imagine their work ends at the giving of advice and the physical examination of patients at the dispensary. They must visit their patients to make sure that the lessons taught at the sanatorium or the dispensary do not fade into forgetfulness, as unfortunately is apt to happen in a great many instances. The whole problem is not only most interesting but vast. The tentacles of possible work stretch out before the imagination in innumerable directions. In point of fact, if the benefits under the National Health Insurance Act had been confined at the outset to tuberculosis alone, everyone would have been pleased, and an immense storehouse of knowledge would have been built for future governmental action.

The whole concern has been unduly rushed, and as a result immense sums will be needlessly spent. But we are accustomed in this country to muddle through: we shall muddle through the Insurance Act in like manner.

If Government would now take up the question of milk supply with a fearless hand the seeds of mischief would not be sown to the same extent as they now are.

The manner in which the milk traffic is conducted in this country is in the big proportion of instances highly unsatisfactory. Government would lose fewer votes by establishing the milk supply on an unimpeachable basis than it might by the stamp-licking enactment.

It has been clearly demonstrated that cows will continue to yield satisfactory supplies of milk even if they be housed in what the dairyman of to-day calls a cold byre. It is not necessary to practise hyperaëration methods on the cow. But to expect cows to remain healthy in dark, stuffy, and ill-ventilated interiors is out of the question.

NEW BOOKS.

Kidney Diseases. By W. P. HERRINGHAM, M.D., F.R.C.P., with Chapters on Renal Disease in Pregnancy by HERBERT WILLIAMSON, M.D., F.R.C.P. Pp. xvi. + 378. London: Henry Frowde and Hodder & Stoughton. 1912. Price 15s. net.

THE keynote of Dr. Herringham's book is expressed by a phrase in his preface—it is "the outcome of many years of work, and is drawn chiefly from my own hospital and my own wards." In its reliance on personal observations by the bedside and in the post-mortem room, it is an agreeable contrast to the modern encyclopædic text-book, crammed with facts garnered from the laboratories in the four corners of the earth: and in reading it one feels that it carries on the best traditions of the English school of medicine, as exemplified in the works of such men as Fagge and Dickinson. A large part of the book, naturally, deals with the subject of nephritis. Dr. Herringham's teaching concerning this disease is that the numerous divisions which have been set up are artificial, and that chronic nephritis is a diffuse process which, in some cases, affects mainly the epithelium, in others mainly the connective tissue, with, also, intermediate forms: clinically, the cases show differences corresponding with the various histological changes. The cirrhotic kidney is at one end of the scale, and by its side come cases of arteriosclerotic kidney. In the cirrhotic kidney the cardiovascular changes are secondary: in the arteriosclerotic they are primary. Primary interstitial nephritis is indistinguishable from arteriosclerotic kidney, and is rare. The majority of cases of granular kidney are the results of a diffuse nephritis. These views will be readily accepted in Edinburgh, for they are in substantial agreement with the teaching of the late Sir Thomas Grainger Stewart. An important feature of the book is the contribution by Dr. Herbert Williamson on renal disease in pregnancy. The principal subjects dealt with are the toxæmia of pregnancy (including eclampsia) and pyelonephritis. The distinctions between the kidney of pregnancy, pregnancy in chronic nephritis, and acute nephritis in pregnancy are clearly stated, though it is confessed that their differentiation in practice is not always possible. Although we have referred specifically to only two items in Dr. Herringham's bill of fare, the others are not less noteworthy. He has written a most valuable book, full of original observations, and giving sound practical advice on the management of cases of renal disease.

Theorie und Praxis der inneren Medizin. By Dr. ERICH MÜLLER.
Bd. II. Pp. xiv.+634. Berlin: S. Karger. 1912. Price
10 marks.

IN this text-book Dr. Kindborg breaks new ground. In addition to an adequate clinical description of the diseases dealt with in this volume—the diseases of metabolism, of the organs of locomotion, and of the alimentary tract—he devotes a large amount of space to preliminary theoretical considerations, to clinical pathology, physiology, anatomy, and methods of investigation and research—in short to the applications of the sciences ancillary to clinical medicine. The book thus claims more attention than the average text-book, and we consider that Dr. Kindborg has produced a volume which will prove very useful to students and others.

Pellagra: An American Problem. By GEORGE M. NILES, M.D.,
Professor of Gastro-enterology and Therapeutics, Atlanta
School of Medicine. Pp. 253. London: W. B. Saunders Co.
1912. Price 13s. net.

THIS volume gives an account of pellagra, with special reference to its occurrence in America. The varied symptoms and appearances of the disease are fully described, and the section on treatment is particularly good. The author supports the maize theory of the etiology of pellagra, and bases his remarks on the prophylaxis and treatment of the disease on that assumption. A short account is also given of some of the experimental work which has been done on the subject. For the British reader there are too many Americanisms to make the English easy reading. The illustrations are numerous, and, so far as uncoloured pictures can do so, give one a fair idea of the appearances of the eruptions.

A System of Treatment. By many Writers. Vol. III. Special Subjects.
Pp. xxxiii., 1194. Numerous Illustrations. London: J. & A.
Churchill. 1912. Price 21s.

WE have already reviewed the first and second volumes of Latham and English's *System*, but the third volume seems to call for comment apart from the others, for it deals with the specialties. It begins with 374 pages devoted to special forms of treatment, including such recent introductions as vaccine therapy and radium therapy, and the older established plans of massage, physical exercises, and hydrology. Dr. Blumfeld deals fairly with the difficult matter of anesthetics, and

states his preference for the C. E. mixture (2 volumes of chloroform to 3 of ether); Mr. Waterhouse has Bier's treatment for his subject; Dr. Lewis Jones treats of electro-therapeutics and ionic medication; and Dr. Gustav Hamel writes on the Zander treatment. The next large subdivision of the volume is concerned with tropical diseases, which are considered under the subheadings of tropical fevers (black-water, dengue, kala-azar, malaria, plague, etc.), general tropical diseases (beri-beri, trypanosomiasis), abdominal tropical diseases (cholera, dysentery, ponos, sprue, etc.), tropical infective granulomata (leprosy, Oriental sore, yaws, etc.), local tropical diseases of obscure origin (ainhum, big heel, chappa, craw-craw, goundou, etc.), and tropical skin diseases and parasitic affections (prickly heat, veldt sore, erythrasma, piedra, pinta, filariasis, etc.). Drs. Daniels, Low, Macleod, and Carnegie Brown are responsible for this subdivision of subjects, with the single exception of plague, which is treated of by Dr. J. C. Thomson. The rest of the volume is devoted to the specialties of the eye, nose and throat, the ear, and the skin; in the last group the name of Dr. F. Gardiner of Edinburgh is prominent, no less than twenty-nine skin diseases being described by him, some of them shortly and others at considerable length. Dr. J. S. Fraser, also of Edinburgh, has articles on middle ear disease and otosclerosis. The book closes with thirty pages on dental surgery, a well written article by Dr. Norman G. Bennett. It goes without saying that all the special subjects are in the hands of men who have specialised in the matters upon which they write, and the editors have sometimes gone outside the United Kingdom to obtain an author with special knowledge, as in the cases of radium therapy (by Dr. Dominici of Paris) and of bronchoscopy (by Professor Carl von Eicken of Giessen). The information, generally speaking, is condensed, correct, practical, and well up to date, and the work is to be heartily commended.

An Index of Differential Diagnosis of Main Symptoms. By Various Writers. Edited by HERBERT FRENCH, M.D.(Oxon.), F.R.C.P. (Lond.). With 16 Coloured Plates and 213 Illustrations. Bristol: John Wright & Sons, Ltd. 1912.

THIS is a most useful work of speedy reference, and the list of contributors is sufficient guarantee of its reliability. The text is arranged alphabetically on a basis of symptoms, but an exceptionally comprehensive general index gathers these together under the headings of the various diseases in which they occur, and so enables the reader to arrive at a differential diagnosis. The illustrations are of a high standard, and we can confidently recommend this work to the practitioner.

Practical Treatment. By MUSSER and KELLY. London :
J. & A. Churchill. 1911.

THIS volume, which completes a system of practical treatment, reaches the high standard of Vols. I. and II. It deals with diseases of the digestive system, of the lungs, and of the urinary and nervous systems. Each article is by an author whose name is recognised as an authority on the subject he deals with. A brief summary of etiology and symptomatology introduces each disease, and this is followed by an exhaustive account of the various methods of modern treatment. Where necessary this is completed by a review of the surgical aspects of the condition. This is all-important in a book of treatment, for we now recognise that the field of surgery, particularly in abdominal conditions, is daily widening, and diseases which formerly were regarded as chronic and incurable can in many cases be greatly benefited or cured by surgical interference. The consideration of digestive disturbances is entered into very fully, the articles on mucous colitis, intestinal indigestion, and constipation being especially worthy of notice. This system of treatment will for some time to come form an excellent reference of modern methods of treatment, and can be thoroughly recommended to practitioners.

The Sexual Life of the Child. By Dr. ALBERT MOLL. Translated by
Dr. EDEN PAUL. London : George Allan & Co., Ltd. 1912.
Price 15s. net.

THIS book is an attempt to unravel the mystery of the beginning of sexual impulses, and though the writer devotes a volume of 324 pages to the subject, we cannot honestly say that he has thrown any fresh light on the matter, or broken any new ground not already exploited by Freud, Kotscher, and Krafft-Ebing. Like the modern novel, which revels in analysing every word, thought, and action of the characters it portrays, to some deep-down, unsuspected, and hidden source, so this book attempts to trace to a sexual basis many of what appear to be quite natural habits and actions in the child. Sexuality in the adult has doubtless a very subtle, though fortunately in many instances a totally unrecognised, influence in determining his actions in many diverse ways, but we prefer to disassociate from our minds any such potent influence governing the innocent life of the little child to any such extent as this volume would have us to believe. The tolerant, nay, the almost encouraging manner in which the author refers to the question of masturbation is not a view of the matter which we share, nor do we think his opinions will be accepted by anyone who recognises the ill effects arising from this pernicious habit. There are many sensible suggestions and remarks in the chapter on sexual education,

but here, again, the manifestations of sexuality in the child are greatly exaggerated, and the work might much more fitly have been designated the perversions of the sexual instincts in the child, as the numerous anecdotes with which the volume is plentifully interspersed are mostly concerned with these unsavoury topics.

Harelip and Cleft Palate. By JAMES BERRY and PERCY LEGGE.
Pp. 310. London: J. & A. Churchill. 1912. Price
12s. 6d.

ALL who are interested in the surgery of children will prize this monograph, which deals with a subject which is one of considerable difficulty and of considerable practical importance.

The preliminary chapters are concerned with the development and with the anatomy and physiology of the lips and palate, the third and fourth with the varieties of harelip and cleft palate and their functional results, while the remaining seven, or fully two-thirds of the volume, are devoted to the operative treatment and its results. Mr. Berry's well-known views are here well marshalled and described, and the details of the operative treatment recommended by the authors most successfully illustrated. Of the "turn-over flap operation," of which so much has been heard in recent years, but little is said, because the authors "think that the results obtained by this method are usually bad and are not to be recommended."

Tumours of the Jaws. By CHARLES LOCKE SCUDDER, Surgeon to the
Massachusetts General Hospital. London: W. B. Saunders Co.
1912.

THIS instructive volume, which is dedicated to the doyen of surgery in Boston, John Collins Warren, is a worthy successor to the well-known monographs on the same subject by Heath and by Perthes. An important feature is the attention bestowed on the pathology of the tumours of the jaws, and the reader is greatly assisted in this rather difficult subject by the number of illustrations. Special attention has also been devoted to the operative treatment of malignant disease, and here it may be noted that the illustrations are of the high degree of excellence we are accustomed to expect in text-books published in America. We cordially recommend the work to the profession in this country.

Urology: The Diseases of the Urinary Tract in Men and Women. By RAMON GUITERAS, M.D.(Harv.). In Two Volumes. Pp. 1424. 7 Plates. 943 Text Illustrations. New York and London: D. Appleton & Co. 1912.

THIS ambitious treatise, including "all the diseases of the urinary tract" and of the male genital tract, deals chiefly with etiology, diagnosis, and treatment. Pathological processes and morbid anatomy are not treated with the same amount of detail, and to many this will form the chief drawback to the usefulness of the work. At the same time we have to consider that it has been avowedly produced for practitioners and students, and on these grounds the meagre treatment of pathology may be excusable. The first volume deals with the anatomy of the urinary and male genital tract, the examination of the urine, and the blood changes in disease, the urologist's armamentarium, and the methods of examination, followed by a consideration of general symptoms and treatment. The remainder treats of the kidneys and ureters. In the second volume are described the diseases of the lower urinary tract, and a chapter on syphilis is included. One of the features of the book is the sustained effort to strike a balance between medical and surgical treatment. Neither is unduly pressed at the expense of the other, and herein the author's experience is of value as a guide to the practitioner. The clinical pictures are accurately drawn and well illustrated by records of carefully-selected cases. An immense amount of time and trouble has been expended on the text-figures and plates, and the reproductions are excellent, but we believe their value is lessened by the fact that the great majority are diagrammatic. The two volumes form an excellent work of reference for the practitioner, and a valuable guide to treatment, but it is too comprehensive to be adapted for students.

Gonococcal Infections. By Major C. E. POLLOCK, R.A.M.C., and Major L. W. HARRISON, R.A.M.C. Pp. 222. London: Henry Frowde and Hodder & Stoughton. 1912. Price 6s.

WE are glad to be able to recommend this small volume, one of the latest of the Oxford medical manuals. The information it imparts is thoroughly up to date, practical, and trustworthy. What, however, we like most about the book, is the obvious air of sincerity that runs through it. This is especially noticeable in the sections dealing with treatment. The authors have had a large experience, and are careful to warn their readers not to expect too much from any particular drug or method. Further, only those methods which they have personally found useful are dealt with in detail. Special chapters are devoted to vaccine therapy and to the important subject of vulvo-vaginitis of children.

Finally, we would refer readers to an interesting research of the authors to test the prophylactic effect of gonococcal vaccines against after-complications in (uncomplicated) cases of recent gonorrhœa. In every second case in a series of 84 patients a single vaccine injection was given on admission. Thereafter both sets were treated identically. Of the patients who had received the injection, four developed epididymitis; of the others, ten developed epididymitis, and one of these in addition suffered from severe arthritis.

The Therapy of Syphilis. By Dr. PAUL MULZER, with a Preface by Professor UHLENHUTH. Translated by A. NEWBOLD. Pp. xvi. + 248. London: Rebman, Ltd. (N.D.) Price 6s. net.

THIS is another of the numerous monographs on the treatment of syphilis to which Ehrlich's epoch-making researches have given birth. Dr. Mulzer is a pupil of Professor Uhlenhuth, to whom (it is stated) we owe the idea of the arsenical treatment of syphilis, and it is therefore not unnatural that he should wish his master to have full credit. Still, the monograph would have been more valuable had Ehrlich's work received greater prominence, and at this time of day atoxyl, atoxylate of mercury, arsenophenylglycin, etc., are merely of historical interest so far as syphilis is concerned, and scarcely deserve the space allotted to them in this book. The discussion of salvarsan is very largely a compilation from the literature, and the various methods of administering it are given in great detail. The book itself is undated, but Uhlenhuth's preface was written in December 1910. Since then a good deal of water has flown under the bridges, and it is scarcely fair to compare this book with more recent and comprehensive monographs. We think, however, that at present there are better guides than this to the chemotherapy of syphilis.

The Prevention of Dental Caries and Oral Sepsis. By H. P. PICKERILL, M.D., L.D.S., Professor of Dentistry, University of Otago. Pp. 308. London: Baillière, Tindall & Cox. 1912. Price 7s. 6d. net.

THIS book is an amplification of the essay which was awarded the Cartwright prize of the Royal College of Surgeons of England for 1906-1910. The author is one of the very few dentists in the world who holds a position enabling him to devote a considerable and continuous amount of time to research work, and the results of his researches, both clinical and experimental, into the problems of dental hygiene are herein set forth. Much of the experimental work is along more or less original lines and so requires confirmation, but it is

interesting to note that it is largely corroborated by everyday clinical experience. The author is to be congratulated upon having added materially to the arguments in favour of the contention that it is quite possible to eradicate dental caries with very little interference with modern conditions of life. The thesis briefly put is that dental caries is due to dietetic ignorance (dental, medical, and lay), and that its prevention lies in a return to a more fibrous and detergent diet, and what is even more important to a diet that partakes largely of an acid character.

Being in complete agreement with the main contentions of the author, we have read the book with the greatest pleasure. We trust that it will be widely read, not only by the dentist but by the general medical practitioner, to whom after all we must look for the spread of the knowledge that will remove this scourge of civilisation, for the time for real prevention has passed long before the child comes under the dentist's care. The necessity for enlightenment on the subject is becoming more and more urgent even from a financial point of view, as increasingly large sums of public money are being spent annually in futile attempts to deal with the ravages of this easily preventable disease.

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Handbuch der Biochemie des Menschen und der Tiere. Edited by Professor CARL OPPENHEIMER, Ph.D., M.D. 4 Volumes. Jena: Gustav Fischer. Price £7, 14s.

THIS work, which is now complete, embraces a very much wider field than the ordinary text-book of physiological chemistry. While the latter treats only of the chemical composition of the normal tissues and organs, and of the chemical changes which take place in them during life, the work before us aims at collecting all the known facts relating to the chemical phenomena of life, whether they are normal or abnormal. We find thus almost a whole volume given over to a detailed account of immunity. Another volume is devoted entirely to the subject of diseases of metabolism.

By dividing each subject into numerous chapters and handing these over to different contributors the editor has been able to ensure a detailed treatment of each subject. A brief summary of the contents will give an idea of the comprehensive nature of the work.

The first part deals with the chemistry of the substances which occur in living tissues. It contains also a detailed description of the chemical and physical chemical methods used in biochemical investigations.

In the second part we find chapters on artificial parthenogenesis and on the physiological action of ions by Jaques Loeb, on the physical chemistry of the cell by Sjuro, on the chemistry of the cell of blood corpuscles and of spermatozoa by Kanitz. L. Michaelis gives a short

account of the process of staining and its significance for the interpretation of the micro-chemistry of the cell. The various aspects of immunity are then discussed in a series of contributions on antigens and antibodies by Hans Sachs, on antitoxins and their relation to toxins by Oppenheimer, on the physical chemistry of the toxin-antitoxin reaction by Michaelis, on haemagglutination haemolysis, cytotoxins by Landsteiner, on precipitins, on anaphylaxis, and on antiferments by Michaelis, and on immunity against bacteria by P. T. Müller.

In the third part there are articles by Höber, Morawitz, Magnus and others on the chemistry and physical chemistry of the blood and lymph, on blood coagulation, on the chemistry of transudates and exudates, and on the chemistry of the blood-forming organs. Then the chemistry and pathological chemistry of the various tissues are treated of. Fifty pages are devoted to an account of the chemical composition of the central nervous system, and twenty pages to the chemistry of the eye. There is also a brief account by Neuberg of the chemistry of malignant new growths.

The fourth part deals with the biochemistry of the secreting glands and their secretions. This volume contains amongst other subjects chapters on the digestive glands, on the internally secreting glands, on milk and the secretion of milk, on the chemistry of sputum, of sweat, of mucus, of bile and gall-stones. The chemistry and physical chemistry of normal and abnormal urine are discussed in great detail.

The fifth part is devoted entirely to the subject of nutrition, digestion, and absorption. It contains articles by Taugl, London, Schennert, Harling, Friedemann, and Weinland.

The last two volumes constitute what is perhaps, especially from the point of view of the clinician, the most interesting part of the work. These two volumes contain a detailed account of all the various aspects of normal and abnormal metabolism. Amongst the contributors of articles dealing with normal metabolism we may mention N. Zuntz, Tigerstedt, Magnus-Levy, Schittenhelm, and von Wendt. In the volume dealing with diseases of metabolism we find chapters on Graves' disease, on myxedema and cretinism, on Addison's disease, on castration and obesity, on fever, on disturbances of the mineral metabolism, and on the metabolism in anæmic and cachectic conditions.

A special tribute must be paid to the care and skill with which the book has been edited. Each chapter is provided with copious and well arranged references to the literature on the subject, and cross-references greatly facilitate the use of the book.

During the appearance of this work we have frequently used and tested it, and we have always found it a trustworthy and comprehensive source of information. Any worker in search of information on questions dealing with the chemical phenomena of life cannot do better than consult this book.

The Physiology of Protein Metabolism. By E. P. CATHCART, M.D., D.Sc.
Pp. 142. London: Longmans, Green & Co. 1912. Price 4s. 6d.

IN this volume, which belongs to the series of monographs on biochemistry, protein metabolism is considered in its more general features. Beginning with the digestion of proteins, the author proceeds to discuss the various views which are held on the absorption and assimilation of protein. The different stages of the intermediate protein metabolism are only briefly dealt with, as they will be made the subject of a separate monograph. A full treatment is accorded to those questions which have a bearing upon problems of nutrition, such as the protein requirement of the body, and the formation of tissue protein from differently constituted food proteins. The volume concludes with two chapters on the effects of starvation and work on protein metabolism.

The book is written in a truly scientific temper. Every problem—and the subject is full of problems, most of which are still unsolved—is fully considered from all its aspects, and although one may not always agree with the summing-up of the author, the reader is placed in a position to judge for himself.

The bibliography is very extensive, and contains references to 430 papers. But the author has not only collected a vast amount of literature, he has mastered it, so that a very intricate subject is presented in a clear and readable manner.

There is one notable omission to which we must refer. In the sections dealing with the relation of carbohydrates to protein metabolism the work of the late Dr. Pavy should surely have found a place, especially since all the recent work, including that of the author himself, has gone far to confirm the essential features of Pavy's doctrine.

Manual of Human Osteology. By A. FRANCIS DIXON, M.B., D.Sc.
Pp. 316. Illustrated with 178 Figures, many in Colours.
London: Henry Frowde and Hodder & Stoughton. 1912.

THIS manual should prove of great use to medical students, especially at the commencement of their studies. The information which it supplies is written clearly and concisely, and the book is adapted in every way for use in the dissecting-room. The author might with advantage have dealt more fully with the subcutaneous bony points and with the ossification of the long bones. The illustration of the latter section by X-ray photographs showing the epiphyses at various ages would add greatly to the practical value of the work, and is surely within the scope of a manual of human osteology. While few will cavil at the free use made of the Basle terminology, the frequent

repetition of such words or phrases as "facies dorsalis," "tuberositas," "angulus," etc., instead of their direct English equivalents, seems quite unnecessary.

The Treatment of Diseases of the Skin. By W. KNOWSLEY SIBLEY, M.A., M.D., Physician to St. John's Hospital for Diseases of the Skin, London. Pp. 280. London: Edward Arnold. 1912. Price 5s.

WHILE the ultimate aim of the doctor is the correct treatment and the cure thereby of his patient, if attainable, there is a loss of due perspective when vision is concentrated too exclusively on the application of remedies. There are now so many admirable text-books of dermatology which embrace the whole subject, that it is questionable if there is room for a work wholly devoted to therapeutic measures. The author claims "that the treatments given are thoroughly up to date—possibly in some cases a little in advance of many of the accepted principles of the present school of dermatology in this country." In support of this details are furnished, among others, of radiant heat, of induced hyperemia by exhaustion cups, of cataphoresis, and of high frequency currents, and advice is offered as to when these are to be employed. Yet the necessary apparatus is not always easily accessible to the ordinary practitioner, while many most valuable but simple methods find no place. The arrangement adopted in the body of the book is an alphabetical one, and each section commences with a short though carefully written definition, which is followed by the scheme of management. He assumes the causation of numerous dermatoses to be due to auto-intoxication, yet there is no reference to Metchnikoff's researches on the corrective power of the lactic ferments. We find tars in combination recommended, but no mention is made of the application of crude coal tar, so well borne and so curative. The value of scarlet red and allantoin in promoting the rapid cicatrization of ulcers is not touched on. Chrysarobin and chrysophanic acid are regarded as synonymous, apparently as if they were equally active and efficient. The method of preparing and the directions for using the boric starch poultice are imperfect and even misleading. We have vainly sought for any notice of eucerine, so serviceable as a bland excipient. We think there ought to have been some allusion to anaphylaxis or acquired hypersensitiveness in a volume which professes to be so advanced. We must admit that we find considerable difficulty in determining for whose benefit the work has been written.

The Journal of Hygiene. Plague Supplement I. Sixth Report on Plague Investigations in India. Issued by the Advisory Committee appointed by the Secretary of State for India, the Royal Society, and the Lister Institute. Pp. 206. University Press, Cambridge. 1912. Price 7s. net.

THE volume opens with an article, accompanied by a photograph, in which sympathetic reference is made to the loss sustained by medical research in the lamented death of Major Lamb, with an appreciative account of his life's work.

Other articles include observations on rat fleas, remarks on the preparation of a preventive and curative serum extracted from the plague bacillus, a report on plague vaccines, statistical investigation of plague in the Punjab, observations on plague in Eastern Bengal and Assam, and records of work bearing on the breeding of *Mus rattus* in captivity.

A single specimen of *Xenopsylla cheopis*, the flea chiefly concerned in the propagation of plague, was found in Plymouth some years ago, the only occasion on which it had been previously detected in this country: the statement, therefore, that of the fleas greatly found on rats trapped in Guy's Hospital 97 per cent. were *X. cheopis* is alarming, and might be regarded as a possible error in differentiation if the observation were not so well authenticated.

Nearly half the supplement is devoted to statistics of plague in the Punjab. While appreciating the amount of care and trouble the author has devoted to this compilation, it is doubtful if the result is of much practical value. Statistics based on reports submitted by village headmen in India must always be accepted with reserve.

In an appendix some interesting figures are given regarding the various epidemics of plague in England, from the first importation in 1348 to the cessation after the Great Plague in London in 1665.

The supplement, which by the way includes many excellent photographs from plague areas in India and Burma, does not furnish much material addition to our knowledge of the etiology or prophylaxis of the disease.

Caisson Sickness and the Physiology of Work in Compressed Air. By LEONARD HILL, M.B., F.R.S. Pp. xii. 255. 66 Illustrations. London: Edwin Arnold. 1912. Price 10s. 6d. net.

THIS volume, which forms one of Bulloch and Hill's series of international medical monographs, and is written by one of the editors of that series, gives a detailed account of compressed-air illness or caisson sickness. The medical aspects of diving, and more particularly, bridge-building and tunnelling by means of compressed-air caissons, are very important, for they will undoubtedly, if better known and appreciated, lead to the saving of many lives lost annually through ignorance.

The book is divided into fifteen chapters dealing with such subjects as the naked diver, the diving dress and the diving bell, the nature, lesions, and cause of caisson sickness, effects of compressed air, ventilation of caissons, decompression and recompression. An important practical matter on which the author insists is that the periods of decompression can be greatly shortened by the taking of active exercise therein and that the breathing of oxygen is of value in a certain stage of decompression. He is inclined to regard the large sums spent by the London County Council in ventilating the Thames Tunnel caissons as wasteful, for carbonic acid has nothing to do with the causation of caisson sickness: it would have been better to have spent the money on cooling the working chambers. Some very interesting remarks are made on fatness as a contra-indication to working in caissons—even lean men should avoid eating much fat while at work in compressed air. The chapters on the theory and practice of decompression are thorough and convincing: evidently the stage method is to be preferred to the uniform one of decompression at any rate for workers in caissons. The setting free of bubbles of nitrogen gas in the tissues during decompression is regarded as the cause of the symptoms of caisson sickness, and for the treatment of them recompression, which gives wonderful relief, is advised. The book is clearly written and well illustrated; it should prove a useful adjunct to medical practice in districts where working in caissons is in progress.

Public Health Chemistry and Bacteriology: A Handbook for D. P. H. Students. By DAVID M'KAIL, M.D.(Glas.), D.P.H.(Camb.), F.R.F.P.S.G. Pp. 409. Bristol: John Wright & Sons. 1912. Price 6s. 6d.

LESS than half of this concisely-written handbook is devoted to a detailed description of the methods used in the chemical analysis of water, foods, beverages, disinfectants, etc., while the remainder is occupied by chapters on the bacteriological examination of water, milk, air, etc., the bacteriology of the bacterial diseases of man and animals, immunity, and anaphylaxis.

The interpretation, from a public health standpoint, of both chemical and bacteriological results might usefully have been dealt with more fully, whilst symptoms and epidemiology of bacterial diseases might well have been omitted.

The description of the preparation and standardisation of vaccines is, for the student at all events, much too condensed: on page 365 "nitrifying" is no doubt a misprint for nitrogen-fixing.

Still, to those for whom it is designed, viz. those taking a course of laboratory work with a view to obtaining a diploma in public health, this book will certainly prove of the utmost assistance.

Electricity, its Medical and Surgical Applications, including Radiotherapy and Phototherapy. By CHARLES S. POTTS, M.D., Professor of Neurology, Medico-Chirurgical College. Pp. 509. London: J. & A. Churchill. 1912. Price 18s. net.

How much the subject of medical electricity has advanced in recent years is well shown by the contents of this book. Not many years ago a book of one quarter the size would have contained practically all that was known of this subject. We can strongly recommend Dr. Potts' book as a safe and scientific guide to the uses of electricity in the treatment of disease. The modern electron theory is referred to. In treating of the electrical resistance of the tissues no mention is made of the resistance of the blood and urine, or of the hæmo-renal index. Kohlrausch's method of measuring the resistance of the body is not referred to, but the method by substitution is recommended. Preference is given to the Wehnelt interrupter and to the mica-plate static machine. There is a good account of high-frequency currents written without bias. There are valuable remarks on X-ray dermatitis. The most important use of the X-rays in carcinoma of the breast is post-operative. We have noticed one or two misprints—in the formula on page 109 the figure 2 is put instead of the letter E: on page 405, line five, the sentence should read "The transparency of a substance is inversely proportional to its density."

The Doctor and the People. By H. DE CARLE WOODCOCK. London: Methuen & Co., Ltd. 1912. Price 6s. net.

IN this fascinating volume Dr. Woodcock has strung together a series of essays on various aspects of medical life and practice. He writes on the social side of medicine—on the different grades of the profession—as a shrewd though kindly critic who has himself gone through the mill, and has played many of the parts which fall to the lot of the medical man. From his pages a true idea can be gained of the conditions under which the popular consultant and the club doctor work, of what is meant by poor relief, of the realities of slum practice, whether in hospital or out. Tuberculosis, public health laws, Midwives Act, Insurance Act, the organisation of the medical profession, are all touched on in a way which cannot fail to hold the attention of the reader. To Edinburgh men particularly the book is of special interest. It is dedicated to the post-graduates Dr. Woodcock has met, and many of our teachers are portrayed with skilful touches. *The Doctor and the People* is a book to read. The author writes only on what he knows: he has imagination, he has humour, and his subject is the most interesting in the whole world—ourselves. Therefore we say again, read *The Doctor and the People*.

NEW EDITIONS.

A Manual of Surgical Treatment. By Sir W. WATSON CHEYNE, Bart., and F. F. BURGHARD. New Edition revised and largely rewritten with the assistance of T. P. LEGG and ARTHUR EDMUNDS. In Five Vols. Vols. I. and II. London: Longmans, Green & Co. 1912. Price 21s. each vol.

SINCE this work was first issued in 1899 many changes have been effected in surgical treatment, and it has been found necessary to rewrite the greater part of the text in preparing the present edition. The title selected by the authors scarcely indicates the nature of the work, as in many sections quite as much space is devoted to the causes, symptomatology, and pathology of the various conditions as to their treatment, and the book in many respects differs but slightly from a text-book of surgery.

The first volume deals with general surgical diseases, including inflammation, suppuration, gangrene, etc. In these sections many of the methods of treatment described are almost obsolete, and the more modern methods are insufficiently dealt with. Bier's treatment, for example, is disposed of in a page of text, while to blood-letting, leeching, and the application of cold, over six pages are devoted. We find no mention of arteriovenous anastomosis in relation to gangrene. The authors do not approve of the iodine method of disinfecting the skin, which "possesses no advantages over carbolic acid, and is apt to leave the skin tender and easily irritated by the dressings."

The section on deformities is in every way satisfactory. The detailed description of the exercises to be carried out is most useful, but we miss any reference to Klapp's "four-footed" exercises which we have found most efficient, particularly in young subjects. Dr. Silk's contribution on anaesthetics is succinct and practical: and a most useful chapter on the examination of the blood in surgical conditions has been added by Dr. D'Este Emery.

The second volume is devoted to surgical affections of the soft tissues and the bones, and to amputations. On the question of massage in the treatment of fractures the authors adopt a moderate and on the whole conservative attitude.

Many illustrations have been added, and the present issue fully maintains the standard set by the former one.

Duodenal Ulcer. By B. G. A. MOYNIHAN, M.S.(Lond.), F.R.C.S. (Leeds). Second Edition. 8vo, pp. 486. London: W. B. Saunders Co. 1912. Price 21s. net.

IN noting the appearance of a second edition of this monograph on duodenal ulcer we would offer our congratulations to the author

on the honour which has recently been conferred upon him. Regarding his work, we can only reiterate what we said of the first edition less than a year ago. No one can write with greater authority on the subject, and few can write more pleasingly or with greater conviction. The most important additions in this issue deal with the differential diagnosis of duodenal ulcer, and the result of X-ray examinations of the stomach after the administration of bismuth. In a separate appendix the author gives a detailed statement of the cases operated on in the years 1909 and 1910—115 in number.

Diseases of the Eye. By J. HERBERT PARSONS, D.Sc., M.B., B.S., F.R.C.S. Second Edition. London: J. & A. Churchill. 1912. Price 12s. 6d.

WE are pleased to note the appearance of a second edition of this textbook. Mr. Parsons ranks as one of the most highly named and erudite of British ophthalmologists, and his book reflects these characteristics. His opinions are so sound and rational and so lucidly expressed that we can confidently recommend the book as admirably fitted for the needs of the student and the practitioner. A special word of praise is due to the illustrations, especially the micro-photographs and the coloured plates illustrating disease of the fundus oculi.

Psychological Medicine: A Manual on Mental Diseases for Practitioners and Students. By MAURICE CRAIG, M.A., M.D.(Cantab.), F.R.C.P.(Lond.). Second Edition. Pp. 474. London: J. & A. Churchill. 1912. Price 12s. 6d. net.

THE demand for a second edition of this work is a satisfactory proof that it has an appreciative public, and a perusal of it shows that it gives a clear and comprehensive account of its subject. While there is no claim to originality, and not much internal evidence of a rewriting of the descriptions from personal observation, the student or general practitioner who knows its contents has a trustworthy guide to what is, it must be confessed, a difficult branch of medicine. Our own authors who are contributing to advance psychiatry, such as Mott, Ford Robertson, Bruce, and Stoddart, are largely quoted from: we might with advantage have had more evidence of a like kind of what is being done abroad, more particularly in Italy and Germany. An attractive feature is the large number of plates (twenty-seven), many of them very beautiful. Most of these have been already published in various scattered papers, their source being duly stated, but it is useful to have them gathered together, forming as they do an excellent sample of what the present-day histologist is doing in brain disorders.

The chapter on treatment is one of the best, and shows how much can really be done to help the insane. But if, as is too often the case in this country, the medical staff of asylums is absurdly small, and hundreds of cases are entrusted to a single physician, perhaps newly graduated, how can personal treatment of any value whatever be given? The medical profession is showing a splendid determination to have its just demands recognised. A tenth part of this zeal would force our parish councils to alter their present parsimonious policy. What we need is more men and more encouragement for scientific work, and we are not sorry to see that under the present conditions much difficulty is being experienced in filling the junior alienist positions.

Diseases of the Genito-Urinary Organs and the Kidney. By ROBERT H. GREENE, M.D., and HARLOW BROOKS, M.D. Third Edition. Pp. 639. With 339 Illustrations. London: W. B. Saunders Co. 1912. Price 21s.

THAT a third edition of this work should have been called for within five years indicates that it has met the needs and gained the confidence of the profession. In the preface to this edition the authors state that they have striven to make the book, above all, of practical utility, and that they have introduced only such new methods as they have personally found to be of definite value. The association of a surgeon and a physician in compiling this work has served to keep the presentation and the relationship of the diseases treated of in good perspective, and to prevent that over-elaboration of specialised methods which is so prone to occur in the work of the pure specialist. The section dealing with the examination of urethral discharges is a particularly valuable one. The influence of the French school is evident throughout the surgical section of the book, and very many of the illustrations are re-drawn from those of Albarran and Duval. The chapter on prostatic hypertrophy is a good one. The authors believe that senile hypertrophy of the prostate is essentially inflammatory in origin, and they bring forward a certain amount of evidence in support of their view.

The subject of radiography receives somewhat scanty treatment, considering the important part it now plays in this branch of medicine. The common mistake of describing the visceral layer of the tunica vaginalis testis as being peritoneum and not germinal epithelium is reproduced, and the cure of hydrocele recommended, namely, incision and packing with iodoform gauze, is not likely to meet with many supporters.

The illustrations are good, and the book is printed in clear type on good paper. It can be confidently recommended to all who are interested in, and who desire a practical treatise on, this branch of medicine.

Materia Medica and Therapeutics. By J. MITCHELL BRUCE, M.D., LL.D., assisted by WALTER J. DILLING, M.B. Ninth Edition. Pp. xii. + 644. London: Cassell & Co., Ltd. 1912. Price 6s. 6d. net.

IN preparing this edition, which completes the fifty-fourth thousand of this well-known manual, Dr. Mitchell Bruce has had the assistance of Dr. Walter J. Dilling. The volume has been very thoroughly revised, and the latest advances in pharmacology have been incorporated. Among new matter added are sections dealing with vaccines and ionic therapy. There is no better student's manual of *materia medica* than this.

NOTES ON BOOKS.

WE have pleasure in recording the appearance of still another edition—the fifth—of Cunningham's *Manual of Practical Anatomy*, edited by Professor Robinson (Henry Frowde and Hodder & Stoughton, price 10s. 6d. net). Some of the plans of dissection have been changed, and the Basle anatomical nomenclature has been adopted throughout. To obviate the confusion which the new nomenclature may raise in the minds of readers who are familiar with the old terms, the latter are added in brackets when necessary, and a comprehensive glossary indicating the differences between the old and new terms has been furnished by Mr. J. Keogh Murphy.

It is only a few months since we noticed the appearance of Dr. Rendle Short's *The New Physiology in Surgical and General Practice* (John Wright & Sons, Ltd., price 5s. net). A new edition has already been called for, and the author has taken the opportunity of revising the work and adding much fresh material. This is one of the books which should be in the hands of every student of physiology, to indicate to him the practical application of the subject, and it is equally indispensable to the student of surgery, to remind him of the principles underlying scientific surgical work.

Diseases of the Stomach, by Max Einhorn, M.D. (London, Baillière, Tindall & Cox), has now reached the fifth edition. Originally written fifteen years ago, when the direct examination of the gastric functions had become general and revolutionised the classification of the diseases, it has undergone various changes in the several editions with the extension of operative treatment. The present edition has been chiefly affected by the advances in radiology, and it contains valuable information on this subject, and on the transillumination of the stomach by means of radium. The radium treatment of carcinoma is treated at some length. The book is based on the author's clinical experience, and it contains the record of many interesting cases. On this account

it is all the more surprising that no mention is made of reflex muscular contraction, and little of hyperæsthesia and referred pain in gastric ulcer.

Landmarks and Surface Markings of the Human Body, by L. Bathe Rawling, M.B., F.R.C.S. (H. K. Lewis), is already so well known that its appearance in a fifth edition need only be announced. Accurate, clear, and concise, it forms an ideal manual for students. The diagrams have always been a feature of the book, and in the present edition have been still further improved. We can confidently recommend it to everyone as a handbook both for study and for reference.

The House-Surgeon's Vade-Mecum, by Russell Howard, M.B., M.S., F.R.C.S. (Eng.) (Edward Arnold, price 7s. 6d.), is a well-arranged course of instruction, intended primarily for house-surgeons, but also for practitioners. Commencing with a description of the accessories of modern surgery, the treatment of wounds, and such constitutional diseases as shock and hæmorrhage, it goes on to deal with the practical aspects of general and regional surgery. The treatment of operated cases and of the complications more commonly encountered is given a prominent position throughout the volume. The chapter on anesthetics, contributed by Dr. Ashley Daly, is written on practical lines, but we cannot agree with some of the statements, as: "The corneal reflex should never be entirely abolished when giving pure chloroform." The illustrations are clear and well reproduced, but we think the value of the book would be enhanced if instruments and other apparatus were more freely figured. The inclusion of seven large diagrams of hernial trusses is surely unnecessary at the present day. In a useful appendix are described the preservation of museum specimens, test-meals, and the administration of the better-known sera.

Among the multitude of text-books of elementary science for schools, differing little in scope, treatment, and excellence, it is very refreshing to meet with Mr. Dell's little book on the practical study of the senses—*The Gateways of Knowledge* (Cambridge University Press, 2s. 6d.). It covers ground that has been almost unexploited for school purposes, though it is not only of great interest to the pupil, but also affords useful information to pupil, schoolmaster, and parent alike. So many boys, girls, and even grown-up people too, take their senses so much for granted, that they neither know nor care how they act, or what is more important, know whether they act properly till irremediable damage may be done. Mr. Dell's book in intelligent hands should largely improve matters in this direction, and schools that are not trammelled by examinations can be cordially recommended to give a trial to this course of experiments. It would probably be better to select a class that was nearer the upper than the lower limit of age suggested (12 to 15), which had gone through some simple preliminary

course of practical measurement. The book is clearly printed, well illustrated, and the experiments described seem on the whole thoroughly practical, though in some cases it would probably be found more convenient for a few of them to be demonstrated by the teacher rather than done by the class.

BOOKS RECEIVED.

- ADLER, I. Primary Malignant Growths of the Lungs and Bronchi (*Longmans, Green & Co.*) 16s.
 BAYLY, H. W. Clinical Pathology of Syphilis and Parasyphilis (*Baillière, Tindall & Cox*) 5s.
 BEDDOES, T. P. Prescribers' Formulary and Index of Pharmacy (*Baillière, Tindall & Cox*) 2s. 6d.
 BILLINGS, F., and J. H. SALISBURY. Practical Medicine Series. Vol. I. General Medicine (*Chicago*) 1 dol. 50 c.
 BIRNBAUM, R., and G. BLACKER. Malformations of the Fœtus . . . (*J. & A. Churchill*) 15s.
 BLACKHAM, R. J. Aids to Tropical Hygiene . . . (*Baillière, Tindall & Cox*) 3s.
 CARTER, A. H. Elements of Practical Medicine. Tenth Edition . . . (*H. K. Lewis*) 9s.
 CHENDELA, J. L. A Treatise on Trichinosis . . . (*Leicester*) Rs. 2.50
 COLLECTED PAPERS of the Staff of St. Mary's Hospital Mayo Clinic (*W. B. Saunders Co.*) 24s.
 COLLETT, A. Smallpox and its Prevention . . . (*John Wright & Sons*) 2s.
 COLLIE, J. Medico-Legal Examinations and the Workmen's Compensation Act, 1906 (*Baillière, Tindall & Cox*) 5s.
 CUSHING, H. The Pituitary Body and its Disorders . . . (*Lippincott Co.*) 18s.
 FITZ WILLIAMS, D. C. L. Edinburgh University Medical Year-Book, 1912 (*Leicester Press, Edinburgh*) —
 GARBETT, P. C. Manual for Women's Voluntary Aid Detachments (*John Wright & Sons*) 1s.
 GEDDES, G. Statistics of Puerperal Fever . . . (*John Wright & Sons*) 6s.
 GOODNOW, M. First-Year Nursing . . . (*W. B. Saunders Co.*) —
 HARE, H. A. Text-Book of Practical Therapeutics. Fourteenth Edition (*H. Kimpton*) 21s.
 HART, D. BERRY. Guide to Midwifery . . . (*Rebman, Ltd.*) 25s.
 HOLLANDER, B. The First Signs of Insanity . . . (*Stanley Paul*) 10s. 6d.
 HOPE, E. W. City of Liverpool Health Report, 1911 . . . (*Tindall & Co., Ltd.*) —
 LAUFFER, C. A. Electrical Injuries . . . (*Chapman & Hall*) 2s.
 MARTINDALE, H. W., and W. W. WESTCOTT. The Extra Pharmacopœia. Fifteenth Edition. Vols. I. and II. . . . (*H. K. Lewis*) 21s.
 MAYO, W. J., and C. H. A Collection of Papers Published Previous to 1909. Vols. I. and II. . . . (*W. B. Saunders Co.*) —
 MILES, C. H. An Historical Outline of Ambulance . . . (*John Wright & Sons*) 3d.
 MITCHELL, S. W. Some Recently Discovered Letters of William Harvey, with Other Miscellanea, 1912 . . . (*Philadelphia*) —
 OETTINGEN, W. VON. Leitfaden der Praktischen Kriegs-Chirurgie . . . (*T. Steinkopff*) 9 mk. 50 pf.
 OSLER, WM. The Principles and Practice of Medicine. Eighth Edition (*L. Appleton & Co.*) 21s.
 PFANDLER, M., and A. SCHLOSSMANN. The Diseases of Children. Vol. V. (*J. B. Lippincott Co.*) 21s.
 PHILADELPHIA General Hospital Reports, 1910. Vol. VIII. Edited by D. Riesman . . . —
 RAWLING, L. B. Surgery of the Skull and Brain . . . (*Frowde, Hodder & Stoughton*) 25s.
 ROBERTSON, WM., and A. M'KENDRICK. Public Health Law . . . (*E. & S. Livingstone*) 5s.
 SAWYER, J. Insomnia: Its Causes and Treatment. Second Edition (*Cornish Bros., Birmingham*) —
 SEMON, F. Forschungen u. Erfahrungen. Bd. I. and II. . . . (*A. Hirschwald, Berlin*) 32 mk.
 SEQUEIRA, J. H. Treatment of Ringworm . . . (*J. & A. Churchill*) 1s.
 STEDMAN, T. L. A Practical Medical Dictionary . . . (*Frowde, Hodder & Stoughton*) 21s.
 TAYLOR, A. E. Digestion and Metabolism . . . (*J. & A. Churchill*) 18s.
 THE Surgical Clinics of John B. Murphy, M.D. Vol. I., Nos. 3 and 4 (*W. B. Saunders Co.*) —
 THOMSON, H. H. Consumption in General Practice . . . (*Frowde, Hodder & Stoughton*) 12s. 6d.
 TRANSACTIONS of the American Urological Association, 1912. Vol. VI. Edited by C. G. CUSTOM . . . —
 TRANSACTIONS of the Glasgow Obstetrical and Gynæcological Society. Vol. VIII. (*Allen, Macdonald*) —
 TRANSACTIONS of the Second Congress of the International Society of Urology (*Aitard & Son*) 10s.
 VINCENT, S. Internal Secretion and the Ductless Glands . . . (*Edward Arnold*) 12s. 6d.
 VULPIUS, O. Translated by A. H. Todd. The Treatment of Infantile Paralysis (*Baillière, Tindall & Cox*) 10s. 6d.
 WALLACE, J. SIM. Prevention of Some Common Diseases in Childhood (*Baillière, Tindall & Cox*) 3s. 6d.
 WILLIAMS, B. G. R., and E. G. C. Laboratory Methods . . . (*H. Kimpton*) 10s.
 WOOD, C. A., A. H. ANDREWS, and G. P. HEAD. The Eye, Ear, Nose, and Throat. Practical Medicine Series. Vol. III. . . . (*Chicago*) 1 dol. 50 c.
 WOOD, H. C., JR. Pharmacology and Therapeutics . . . (*Lippincott Co.*) 18s.

EDINBURGH MEDICAL JOURNAL.

EDITORIAL NOTES.

National Insurance Act.

At a meeting of the Executive of the Scottish Medical Insurance Council, held in the hall of the Royal Faculty of Physicians and Surgeons, Glasgow, on 15th October, the following important resolutions were passed:—

In regard to the working of sanatorium benefit in Scotland, it was resolved, That the Executive of this Council make a strong representation to the Local Government Board for Scotland that the proposal which has been made in some places to appoint as chief tuberculosis officer the Medical Officer of Health is opposed to the interest of tuberculous patients and the community generally, and should not be sanctioned: That the chief tuberculosis officers should be men experienced in the varying clinical manifestations of tuberculosis, who would be trusted by the profession to act in the position of consultants: That the Council further insist that patients enjoying sanatorium benefit at their own homes should have free choice of doctor.

The Executive approve generally of the Model Scheme and scale of charges of the State Sickness Committee of the British Medical Association for treatment of tuberculosis, and commend it to all the areas.

With reference to the Provisional Regulations issued by the Commissioners for medical benefit, it was resolved, That the Provisional Regulations are not acceptable to the profession in Scotland. While admitting that they are in the main the logical outcome of the provisions of the Act, they serve to accentuate and render more obvious the difficulties of the medical service proposed under the Act. This Executive Committee further desires strongly to express its regret that no real attempt seems to have been made in them to satisfy the minimum requirements of the profession.

A further resolution was passed that it be a recommendation to the profession in Scotland to have nothing to do with the Insurance Act as at present defined by the Regulations for the administration of medical benefit.

The Present Position.

DURING the past few weeks the position in relation to the Insurance Act has been modified by the issue of the Regulations and by the Chancellor's offer of terms. Although on some points these are not consistent, together they are a step in the right direction, and it would be ungracious to do more than

remark on their belated appearance. Their essentials are, or ought to be, familiar to all medical men, and it is no part of our purpose to discuss them *seriatim*. It is more to the point to consider what course is right and politic.

The great difficulty in which medical men have been placed by the Insurance Act, and the vexatious strain to which they have been subjected by repeated delay, have intensified the desire for a definite and early settlement. In the circumstances the temptation to accept material, though partial, concessions is naturally great, and there is some fear lest in compromising on details the principles of our opposition to service under the Act be forgotten.

The six cardinal points were put forward, and have always been adhered to, as a minimum demand, not a basis for negotiation; in them we laid all our cards on the table. The demands were not conceded in the Act, they are not conceded in the Regulations, and the advice of the Scottish National Insurance Council is the logical consequence of events. That this advice will be acted up to in Scotland we do not doubt, for in no part of the kingdom is the profession better organised and more determined in its attitude. We have, however, the country as a whole to think of, and the effects of a break away of any considerable body would be disastrous: moreover, since the Insurance Council's meeting, Mr Lloyd George has made his terms known. Although more generous than had been anticipated, they fall short of what had been deliberately asked, and are hampered by conditions, some of which are objectionable in themselves, and others in the endless vistas of trouble they open up. We refer to the supervision of such purely technical matters as methods of diagnosis by Insurance Committees, and the keeping of records of illness. How burdensome the latter might become, and how readily it lends itself to being made a method of purely statistical inquiry, is obvious on the face of it, and something more than a mere undertaking that the records "shall be of the simplest character that will give the necessary information" is needed.

Although the profession might logically refuse to budge from its position, an intransigent attitude would be contrary to the spirit of our country, which abhors logic as Nature abhors a vacuum. The public, our masters, are masters of the Government also, and they may be trusted to see fair play. It is agreed all round that pressure has already produced unlooked-for concessions, and we are convinced that more can be secured. As a practical policy, therefore, negotiations should be resumed. It is the best way of laying our case before our countrymen, and of showing that our opposition is not factious.

No doubt the advice will be unpalatable to some. *Timeo Danaos et dona ferentes* must have been the feeling of many a reader of Mr. Lloyd George's speech as he recalled rhetoric about sickroom wrangles, rude

ineptitude, and the doctor's income. It is, however, as fatal a mistake to underrate an opponent's difficulty as to overrate our own. If the doctor's position is precarious, what of Mr. Lloyd George's reputation for statesmanship? It trembles in the balance against his ability to secure our goodwill. We do not wish to fan the embers of old controversy, but we are entitled to take his speeches as a whole—his threats to place us under the heel of the friendly societies by suspending the medical benefit (a threat, by the way, that he is in no hurry to carry out), his flings at the leaders of the profession, and his curt denial, on the very eve of the representative meeting, of our demands. We may fairly read his latest speech in the light of those that preceded it, and remember we are listening to a past master in the arts of cajolery. Frankly, our suspicions are not disarmed by his new-found courtesy. What, then, are his alternatives if he does not come to terms?—Suspension of medical benefit, which spells palpable failure; or national medical service thrust at six weeks' notice on an unprepared community, and officered, it is safe to say, by not the best members of our profession—an almost incredibly difficult task. There seems no third choice, hence we believe that a settlement more favourable than the present offer can be obtained alike for the community and the medical profession if a firm stand be made.

Negotiation presupposes concession, and we would be prepared to give up the £2 wage-limit if in return we were granted more adequate representation, freedom from society control, and remuneration on the British Medical Association scale. The new conditions as to certificates and records would require very precise definition, and the supervision of purely technical matters by Insurance Committees most careful limitation. It should be made clear that, material as remuneration is, freedom from the control of the friendly societies, and the absence of anything savouring of interference between doctor and patient, are no less important. On these lines there is possibility of lasting settlement.

**Mr. Flexner's
Report.**

IN our last issue we referred to the Report on Medical Education in Europe prepared by Mr. Abraham Flexner for the Carnegie Foundation for the Advancement of Teaching, the body administering Mr. Carnegie's benefaction to education in America and Canada. An earlier report issued two years ago contained a merciless exposure of the defects of Transatlantic medical schools. The present volume is not so sensational, for its author admits that while faults may be found in all the European schools, the scandal of licensing doctors who possess only a book-knowledge of disease exists in America alone. At the outset it may be said that the degree of care with which Mr. Flexner has examined the systems of the different countries varies. The study of the German schools has evidently been prolonged and thorough, that devoted to

London has been, on the whole, adequate, that of the provincial English and the Scottish schools superficial. The author finds his ideal in Germany, whose pre-eminence in scientific medicine he traces to the facts that its medical schools form one organic whole, that the universities control the clinical teaching of the hospitals, and that promotion from university to university comes alone to the successful investigator. He, however, fails to recognise that more than the training of the specialist is required of an ideal system. It is undoubtedly a notable asset for a nation to possess a roll of distinguished professors and to be the Mecca to which the embryo teachers of other countries repair for study, but to the prosaic Briton, thinking along practical lines, the primary object of a medical school is to produce properly educated practitioners, and it is here that the German system breaks down. Mr. Flexner shows in the most damning fashion that even for the able man the education is narrow, and that the ordinary German medical student may and usually does scamp his courses with impunity, may rely on cramming for his qualification, and almost invariably enters practice without any true clinical work in a hospital. The Report admits that in Germany there is nothing to compare with the daily ward routine, which is the essential basis of British medicine. It is true that while Britain efficiently trains the ordinary practitioner and the consultant, it has still to evolve a distinct class of scientific workers in medicine; yet Mr. Flexner's work cannot be read without the feeling that it may be easier for this country to put the final on its system than for Germany to provide for the proper training of the working doctor. We, in fact, believe our task here to be a question of organisation, and especially of money. The country cannot be lacking either in brains or scientific capacity, from which have come all the great advances made during the last twenty years—in chemistry, physics, biology, physiology—advances associated with such names as those of Dewar, Ramsay, J. J. Thomson, Bateson, Schäfer.

We have indicated that Mr. Flexner has evidently devoted less time to the British than to the continental, and especially the German, schools, but his criticisms are no less free. He finds no uniformity in school education, and thus the students commence their courses with different degrees of preparation. The medical schools have no general university ideal: in many cases they contain a proprietary element; and, especially in London, their energies are dissipated by having to prepare students for, it may be, half a dozen qualifying examinations. There is no circulation of clinical teachers from school to school, and thus the members of the staff have to look to the attainment of consulting practice rather than to engaging in scientific medical work for advancement in the profession. The purely scientific subjects are still to a certain extent in the hands of physicians and surgeons, and in many schools the scientific equipment is inadequate. Notwithstanding

these defects, the importance of the intensely practical character of British medical teaching is freely recognised, and it is admitted that, in spite of difficulties, there are many members of the staffs who do contribute to science. In passing, we should like to protest that the constant reiteration of the existence of a proprietary element in the British medical schools is likely to give an altogether false impression of the importance of this factor to Americans, for whom the Report is intended. It is one thing to have, as in America, mushroom proprietary schools without academic connection, existing directly or indirectly on students' fees, and preparing candidates for official examinations whose standards vary in different States of the Union and which in many cases afford no real test of medical knowledge: it is another thing to have, as in the London hospitals, nominally proprietary schools, which carry on a century-old tradition of efficiency, and whose pupils must prepare for examinations controlled, and to a certain extent unified, by an imperial body like the General Medical Council. The fact that in most of these technically proprietary schools men are being prepared for university examinations causes a general tendency to work up to an academic level. Nowhere is this more evident than in the Edinburgh Extra-mural School, where, as is well known, most of the students take the university degree.

This leads us to deal with what Mr. Flexner has to say of the Edinburgh school. In spite of an impression which has obtained currency—founded on his exaggerated criticisms of certain defects—the verdict on the whole is favourable. Due credit is given to the efficiency of the university training and equipment in the scientific subjects, although strictures are passed in individual cases. We last month dealt with those relating to pathology, and we would only add that this limb of the organism is not quite the mass of disarticulated bones which it is represented to be in the Report. Mr. Flexner's criticisms of Edinburgh anatomy are, however, hardly fair. It is ridiculous to indicate that the anatomy department has not been a centre of scientific work, and that the main object of the teaching is its technical applications to surgery and to medicine. The truth is, that ever since Goodsir's time the subject has been taught in the light of embryology and comparative anatomy, and to take exception to the added drill of the dissecting-room and the bone class is to ignore what we have already insisted on—that the primary object of a medical school is to train practitioners. If during the last sixty years the professors of anatomy have not been productive scientists, we confess we do not know where such are to be found. Again, in applying to Edinburgh his reiterated criticism of the absence of academic ideal in British clinical teaching, Mr. Flexner has not been quite fair. He has confused the systematic with the clinical lecture. He has not realised the personal attention received by the student at the bedside, and the

clinical work of the out-patient departments and of the dispensaries, obtains only a passing remark. He, however, admits that in Edinburgh, more than in any other British centre, scientific work in the clinical laboratories of the wards, and in the recently established clinical research laboratory, is obtaining a foothold. On the general question here, it is doubtful whether the intrusion of the scientific ideal into clinical work in this country can be realised by the institution of professorships largely divorced from practice such as obtain in Germany. British individualism, which is essentially an ethnological trait has governed the evolution of the British position, and advance can only come from developing the existing organisation. Even on the Continent research in scientific medicine is chiefly in the hands of the younger men, and in Britain an essential factor in the solution of the problem must be the relief of the younger members of the school from the cares of bread-and-butter teaching and practice.

There is one weighty paragraph in Mr. Flexner's Report which we feel must be taken to heart by the Edinburgh school. In discussing the stimulus which it has been urged is provided by local competition, he says: "The legitimate rivalries of science and education are now fought out on a higher and broader plane. Edinburgh is no longer a closed arena in which university and extramural instructors can compete for students on the basis of the success of their respective candidates before examining boards. New standards prevail; and the entries are world-wide. . . . Under such circumstances the local ranks must be brought together. Whatever hampers the university in its choice of men, its organisation of instruction, its distribution of students is but a reminder of an era whose accounts are already settled. Moreover, it must not be forgotten that while division between the extramural school and the university adds nothing to the total resources of the Edinburgh school, it subtracts a good deal; that is, Edinburgh actually has less to offer the student now than it could offer if its resources were pooled."

Appointments.

DR. B. P. WATSON, Edinburgh, has been appointed Professor of Obstetrics and Gynecology in the

University of Toronto.

Mr. W. G. Porter, F.R.C.S., has been appointed Surgeon for Diseases of the Ear and Throat to the Royal Hospital for Sick Children, Edinburgh.

Mr. James Lochhead, M.D., F.R.C.S., has been appointed Assistant-Surgeon to the Colonial Hospital, Gibraltar.

THE PLACE OF PATHOLOGY IN THE MEDICAL
CURRICULUM.

INAUGURAL LECTURE DELIVERED ON 9TH OCTOBER 1912.

By J. LORRAIN SMITH, M.D., F.R.S.,
Professor of Pathology, University of Edinburgh.

WHEN we consider the prominent place which is given to pathology in the medical curriculum of to-day, it is at first sight difficult to realise that it was as late as 1831 that the University decided to establish a chair in the subject. Though this was the date at which the step was taken, we are not to suppose that the subject had sprung into existence in the early years of the nineteenth century, and that the University had awakened suddenly to its importance. You will find that from the earliest times all who worked at the explanation of the facts that came under their observation in the field of medicine were necessarily pathologists. The duty of teaching the subject was undertaken in the schools by the departments of medicine and surgery, and pathology came to be treated as a separate subject when they found it impossible to do it justice while they were responsible for their own branches of medical science. The separation of medicine and pathology is even now in the process of completion, and in certain schools you will still find pathology in the charge of those who at the same time teach other subjects.

Further, you will hear the view put forward that the separation has not been altogether beneficial. The teacher of pathology who is entirely freed from all responsibility for the care of patients is said to become indifferent to certain aspects of the subject which are of vital importance. He tends, we are told, to become absorbed in abstruse questions which, except to a few like himself, have little interest, and are too far removed from daily practice to be of any utility. The corrective for this abnormal habit of mind is the demand for immediate attention to concrete things—a demand which is presented by the patient suffering from disease and requiring to be healed. The knowledge of disease which is to be obtained from a study of diseased tissues in the laboratory is made wider and deeper and truer by a simultaneous study of the patient to discover how to bring about a cure. Hence arises the reluctance to separate pathology and medicine. The reasons for the separation were, however, sufficient to convince the University authorities of eighty years ago that a chair

in pathology would be a valuable addition to the medical faculty. But up till the present time the holder of the chair has had, as you all know, the charge of patients in the Infirmary. He is henceforward to be freed from this responsibility, and, according to the law which is laid down in the Ordinances, he is not to engage in private practice. The attractions of private practice I need not describe: they are familiar and well known to be powerful, but in resisting this temptation the professor of pathology will in future have the valuable support of the strong arm of the law. The corresponding temptation to engage in pathology which might conceivably come to teachers of the practice of medicine and surgery has for some unexplained reason escaped the attention of legislators. The Ordinance forbidding practice is but the further development of the policy which was adopted by the University eighty years ago. The fact that this step has now been taken will have the attention of all who have at heart the interests of the medical school. The effect of the change will be in the first place to restrict the field of labour for the professor, and since this change has been brought about by the development of the subject, it is worth while at this point to explain the problem which the pathologist sets out to solve, and the relation of its subject-matter to that of the clinical physician and practitioner.

Pathology is often defined as the science of disease. This general definition is easily remembered, and while it is not very precise, it has the merit of simplicity. The study of the body in health is carried out by the two sciences of anatomy and physiology. When the body becomes diseased the normal activities are modified with more or less harmful results to the general life, and in cases when this condition endures for a sufficient time, even the structure of the tissues becomes changed. So that tissue elements, the presence of which are essential to the activity of the various organs, are destroyed, and the body becomes permanently maimed. There is therefore a certain physiological degradation of tissues in disease. If you have studied anatomy and physiology never so little you must have found much interest in observing the way the different organs are built up of a combination of highly specialised forms of tissue, delicate in structure, but full of activity by which the body as a whole profits, while along with these elements are to be found more simple and less developed tissues whose function shows little activity, and consists chiefly, if not altogether, in forming the framework which binds the organ together and supports

it. These structures are called the connective tissues, and when disease takes effect it becomes evident that the chief damage falls on the highly specialised and delicate tissues, and they are injured often to the point of complete destruction: but the attack which is sufficient to destroy these structures may do no more than stimulate the connective tissues into active growth. Disease of long standing tends therefore to substitute the inactive elements for the more active—to deprive an organ of its function by destroying the very elements on which its special activities depend. The aim of treatment is to prevent this process from taking place, by discovering the means of neutralising the effects of the primary attack, or, if this be impossible, to arrest its development, so that further tissue degradation may be avoided. There are therefore two ways of studying the process of disease. We may adopt the original method of observing the patient clinically, and discovering as best we can the progress of his case by careful study of his symptoms, and the development of all unfavourable signs. The other way of gathering knowledge of disease unfolds itself when we find that certain structural changes occur in the organs corresponding with the perversion and loss of function which we have clinically observed.

Observations of this kind form the body of knowledge which has been called morbid anatomy, and it is on this foundation that the science of pathology is built. It is in morbid anatomy that there has been found one of the commonest meeting-grounds of the pathologist and the practitioner. That the two should agree in their conclusions is the aim before each investigator, and until they agree there remains an irritating dissatisfaction which goads the observers into further inquiry and research. The pathologist and the clinician cannot do without each other. The perfect clinical observer examining a patient must have in his mind's eye a picture of the structural changes which have occurred in the body and which have led to the development of the symptoms. Without this his knowledge is, above all, formless and vague. All this, you will say, justifies the old arrangement that medicine and pathology should be taught together, and were pathology nothing further than description of structural changes, there would be much to be said for the continuance of the original plan.

It would be interesting to resuscitate an undergraduate of the year 1831, when the University was taking the step of giving pathology a separate chair. He would, I have no doubt, feel sorry that he had not lived a little earlier in the history of the world—

say, 100 years before his day—when the joys of his life as an undergraduate would not have been reduced by his having to take on his shoulders this additional burden. A striking characteristic of the medical student is the instinctive dread he has of becoming over-educated. He often gives expression to his feelings on this subject, and not infrequently he spends much time in the effort to make sure that he shall not suffer from this form of mental deterioration. Taking the undergraduate of to-day, however, let us try to look at the subject from his point of view. He comes to the science of pathology after he has mastered anatomy and physiology, so that he is now familiar with the structure of the normal body and its various functions. He has to set out for new worlds to conquer, and one of these he finds in the science of disease. The difficulty he has to face is, that he is set to study in detail one side of the subject while he is unacquainted with the other. He must, in the first instance, inform himself of the appearances of the organs which are abnormal, and associate them with the disease to which they are due, and he must learn their meaning; but it is from observation of the disease in the living subject that the meaning is obtained, and this is an effort which is as yet beyond him. We can show him the heart, let us say, and the abnormal appearances which are to be seen in its covering, its walls, its blood-vessels, its nerve supply, and on that we build up an account of the disease. But he has never made an examination of the heart in its activity. He therefore becomes a pathologist before he is a physician. Observe how the order of things is reversed. In the old days before 1831, to which we have been looking back sympathetically, the teaching was by men who were engaged in medical and surgical practice, and the pathology which was taught did not, as now, come before clinical experience. At the most it came along with it. Now it is studied before medicine, and in the reasons for the change we may discover the part which pathology has to take in training the undergraduate for his professional work. The undergraduate is a pathologist before he is a physician or surgeon, and there is a real reason for this, though on the face of it it looks like a reversal of the natural order of the curriculum. The reason is that the subject has developed in various directions, much in the same way as has happened in physiology—by the application of the exact methods of physics and chemistry, and it is due to this that pathology no longer remains in the obscurity of being an appendage to medicine.

We must still begin work at pathology with a study of morbid

anatomy in the post-mortem room and in the laboratory, and when we have learned the general facts which are observed there, we proceed to the experimental analysis of them by the more elaborate methods. The student must become master of morbid anatomy whatever else he may neglect. It is the part of pathology which he will be called upon to apply in his practice, however humble or exalted that may be, and the demand for knowledge of this kind has been very much increased by the duty of drawing up reports of cases for the law courts which is becoming more and more a part of ordinary professional work. This branch of pathology is indeed essentially the same as clinical medicine.

The further developments may be divided into three groups--chemical pathology, morbid histology, and bacteriology. The division is, however, a very rough one, for these three parts of the subject cannot be separated from each other by any strict delimitation. By means of chemical methods much progress has been made in the explanation of the changes in metabolism which result in degeneration and death of the tissues. The outstanding characteristic of the problem which presents itself to the chemical investigator is its complexity, and consequently the greatest difficulty is to discover methods by which the complexity can be unravelled. The materials which enter into the living cell form a structure, or system, the elements of which are all related to each other in a subtle fashion which we endeavour to define; but the more this system is studied, the more does it appear that the ordinary conceptions of chemical and physical relationship are too simple for the purpose. The bodies on which the activity of protoplasm depends are often to be described solely by the effect on the cell itself of their presence or absence, and as yet we are unable to isolate them and study them by the ordinary methods of chemical analysis. We find, for example, that the presence of a toxin may so act on the structure of striped muscle that it is converted into a homogeneous mass which no longer has the power of muscular contraction. The toxin we have never succeeded in isolating chemically, and the molecular arrangement by the disturbance of which the muscle fibre loses all its characteristic structure and activity is also unknown. We know here only that the action of the toxin has taken place by the effects on the living structure. Much progress has been made, however, and important conclusions have been established in relation to the various organic and inorganic bodies which enter into the living cell. We find, for example, that work on the dis-

turbances which are connected with carbohydrates and fats and lipoids has been carried to a stage at which the conception of degeneration begins to take a definite shape, and the essential elements of the disturbance can be to some extent separated from the accidental. Similar results have been obtained in regard to nitrogenous bodies, and from these we are on the way to learn how a toxin attacks the cell structure and reduces it to chaos.

Again, the application of histological methods is yielding most important results in enabling us to interpret the processes of disease. It is sometimes contended that the histological study of pathological processes is more or less barren in results. The tissues of the body have all been carefully examined, and we are told this field of work has been exhausted. We have only to reflect, however, on the contributions to pathology which have come from the histological work of Weigert and Ehrlich, to see at once that a new principle introduced as a basis of microscopic investigation may revivify the whole science, not because we can make more beautiful preparations to look at, but because the new methods enable us to throw more and more light on the obscurity of the problems we have to solve. Histology will not be exhausted till the problems to be investigated in pathology generally have all been solved.

In the third place, we also owe much to the science of bacteriology. It has introduced us to a new conception of the process of acute diseases, and many of these have been actually proved to be due to bacterial poisons. It has also made clear the nature of many of the long-standing chronic processes which develop slowly, and at the present time a great deal is being done to work out methods of treatment which have been derived from experimental investigations in the bacteriological laboratory. By the help of these three branches of pathology we are now gradually reaching a conception of the cell economy, and of the nature of the molecules, or combinations of molecules, which can be attacked by toxins, or other poisons. The nature of the attack we try to define chemically: the effects on the protoplasmic structure we observe by histological methods; the nature of the attacking agent we define in the study of bacterial toxins.

It would take me too far afield to deal with other illustrations of the work of pathology. Nor do I wish to burden you with further detail. The purpose I have in view is to show how pathology has come to take its present-day form as an independent science which gives its own description and

interpretation of disease, and how it is possible for the undergraduate to be a pathologist before he is a clinician. When both branches of medicine have been mastered by the student, their essential unity will become clear to him. It is the aim of the course to provide the undergraduate with a knowledge of the principles of pathology and as far as possible to leave him in the attitude of inquiry. He will during his professional life have ample opportunity of making observations, and the aim of the pathological teaching must be to show him how the facts which he is observing can be made the subject of exact scientific investigation. The time will come when he has passed his examination in pathology, and he will realise then how short has been the period allowed in his course for acquiring so much knowledge. Knowledge rapidly acquired is apt to vanish away, and the amount of knowledge which can in the time be packed into the "one small head" which is available, is not very great. The medical curriculum as a whole perhaps hardly takes sufficient note of the frailties of the average man.

Pathology is an early subject in the curriculum, and before the final stage is reached you will find much of it requires to be re-absorbed. Now the remedy for this is post-graduate study, which can be done slowly and deliberately, and which will therefore in the best possible way supplement the work of the undergraduate days. To the post-graduate student, however, the best means of study is not to be found in stated courses of lectures, but in research. It is impossible with the limited time at his disposal for the undergraduate to do any serious research work, but when he has taken his degree it often happens that there are still undisturbed hours in his life when quiet work and reflection are possible. He is left to the freedom of his own will, for he has no more examinations before him, and he has not yet submitted to the cares of a large practice. Let me commend to him the wisdom of using this time for original research should the opportunity offer. While he is holding a junior post in the hospital, or after that period has passed, he should, when possible, find his way to a laboratory, and take up research that he may discover the basis of that knowledge in the acquiring of which he has spent so much time and effort. The development of pathology, to which I have referred in what I have already said, is due entirely to research, and modern schools of medicine are vying with each other in investigation and in the work of adding to our present knowledge. I do not urge any

special claim for pathology in comparison with other medical sciences as a field of research; but the very intimacy of the connection between it and clinical medicine makes it easier for a man whose chief interest is in practice to undertake research in pathology. I have tried to show that pathology in modern times is an experimental science, and anyone who desires to be really abreast of it must give himself to research. The reply which I hear when I urge this view of the matter on graduates is that research is too difficult, and implies gifts that are not bestowed on the ordinary man. This is no doubt true if all who enter a laboratory aspire to emulate the masters of science. Dr. Hutchison Stirling in his well-known address to your predecessors who were undergraduates in this school, said: "If the fall of an apple on the nose of Newton caused the thought of gravitation in his brain, it is quite certain that whole bushels of apples might have fallen on our noses without the least approach to any such result." Should such an experience be ours, no doubt some of us would be troubled about our noses and the risk to which they had been exposed, while others perhaps would turn their attention to the apples. Each man must work according to his several ability, and one benefit which inevitably comes, even though no world-shaking discovery may have resulted from his research, is that he learns to understand and value the research work of others.

The field for research is exceedingly wide, and becomes wider as the years pass. It is gradually being recognised that since pathology has been clearly divorced from medicine, so that each can pursue its own path, the time is coming for bringing them together again in a state of amicable independence. It is found that the methods of investigation which have been shown to be applicable to the study of disease in the laboratory must be used in conjunction with observations on the living subject. With this in view special observation hospitals are being formed in connection with the research departments of some of the medical schools. How far this development will go, we need not attempt to prophesy. It has followed from the fact that so much of direct therapeutic value has come from the laboratories. Now a fully-equipped pathological institute finds it necessary to provide for the investigation of curative methods. To put this work on a perfectly satisfactory footing, it is becoming essential that the department should be able to give the workers full control of the means of making these observations. The phar-

macologist, the bacteriologist, and the pathologist are each asking for these opportunities.

The same purpose is in the minds of those who are suggesting that some of our clinical teachers should be appointed to posts in which they would be free from the claims of practice, and be able to give all their time to the work of the observation and investigation of disease in the hospital wards. These various suggestions have all the same aim, and that is, to bring the laboratories and the practice of medicine together again, so that the science of medicine may no longer suffer the loss which came from their separation.

This re-arrangement of the work of the school raises far-reaching questions, the answer to which lies in the future. The isolation of the laboratory workers in the past has perhaps provoked some to doubt as to the aim for which these institutions have been established and carried on, and the purpose for which they have been founded has been liable to be misunderstood. But they have gradually by the results of their work more than justified themselves, and now the development of the sciences they represent is leading to an extension of their sphere of work, so that by the direct observation of patients they may apply all their resources to the diagnosis and treatment of disease.

The new method of working on this old principle will have been discovered when we find an arrangement by which the departments of pathology and of medical practice will be so united that, without limiting or restricting the field of either, together they will more effectively than in the past contribute to the great purpose of preventing suffering and the wastage of human life.

HABIT: AS EXEMPLIFIED IN THE FUNCTIONAL ACTIVITY OF THE EYE MUSCLES.

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THE innervation of the eye muscles offers one of the most beautiful and most easily studied examples of the development of a habit. There is exhibited in connection with the functional activity of these muscles what I have elsewhere called the tendency to the persistence of constantly called-for states of innervation. In other

words, a particular innervation effort tends to become habitual when it is repeatedly called into existence.

This habit of innervation accounts for many of the abnormal conditions which are too often ascribed to other causes, with the result, not only that much confusion exists as regards the etiology of various anomalies, but that mischief may be done, and is done, by treatment undertaken under erroneous conceptions as to their pathology. It is important to recognise that the same factor is at work to give rise to what are looked upon as normal conditions in the action of the eye muscles as may lead to abnormal ones. The habit formed may be a good habit or it may be a bad habit, a circumstance which is not without parallel in other connections as well. For an individual who always maintains a parallelism of the axes of his two eyes when looking at distant objects, looking straight becomes a *habit* which tends to persist, and which may be almost indefinitely retained, even though conditions may otherwise be, or become, unfavourable, as, for instance, when the sight of one eye is lost: whilst another individual who is more or less constantly squinting eventually acquires the *habit* of squinting.

There are evidently very considerable individual differences in the rapidity with which a habit will develop. Habits, too, in the sense of the persistence of constantly called-for states of innervation are apparently more readily acquired in the young and more readily lost in older people, and this, too, whether the habit is a useful one leading to normal conditions, or a less desirable one causing abnormality. To take the same illustration, other things being equal, an elderly individual seems more quickly to lose a previous parallelism of the ocular axes and develop a divergent squint on the loss of sight of one eye than a younger individual does. And, again, there is not the same frequency to be met with in the persistence of a convergent squint in older people as there is in the young. The habit, good or bad, as the case may be, is more readily lost as one gets older: always subject, however, to important individual differences.

The associated movements of the two eyes are brought about by innervations to the muscles which act together. These innervations are of two kinds, viz., (1) innervations to associated movements in the same direction—to the right, left, up or down, or in intermediate directions upwards or downwards to the right or left; and (2) innervation to associated movements in opposite directions—converging movements. In all cases the innervation is equally distributed between the two eyes. We cannot turn the

right eye outwards without at the same time turning the left eye inwards, and that independent, too, of whether the eyes are straight or squint to begin with. The association may be interfered with, but only by paralysis or by some obstacle which causes a mechanical hindrance. But even in such cases it is the associated movements themselves that are rendered abnormal, not the impulses, *i.e.* the innervation mechanism. When that mechanism is impaired it tells equally for both eyes. We may, for instance, find, as the result of disease, complete or partial loss of power to move the eyes in association in some particular direction. I have met with cases in which the loss of power affected the association to the right, others in which the loss was for rotation to the left or upwards or downwards. Occasionally, too, a complete loss or defect may exist at the same time for more than one direction of rotation. The causes of these defects, when they have persisted, have been shown to be pathological changes in the central nuclei of the oculo-motor nerves. The fact that the impulses sent to the two eyes to associated movements in the same direction, whether weakened or not, are equally distributed, is conclusively shown by the character of the diplopia met with in the slighter degree of ocular paralysis.

The demonstration that the same equal distribution characterises the convergent innervation is perhaps not so easy. It can at all events be shown that one eye never makes a convergent movement alone; both are stimulated to convergence simultaneously. And when convergence is completely or partially paralysed or otherwise weakened or lost, this takes place simultaneously in both eyes. The analogy, too, with accommodation innervation, which starts from a centre very close to the convergence centre, is very suggestive, as it can be shown that the accommodation impulse is identical in degree in the two eyes.

There is an important difference between the associated similarly directed eye movements and the converging movements. The former can be readily elicited without the necessity for having any object on which to fix the eyes. Anyone, by merely willing it, can turn the eyes to the right or left or up or down without having anything to look at. One can do so in the dark. A blind man can do so provided he is not the subject of any ocular paralysis. A squinter, if the squint is a non-paralytic one, can do so. Moreover, the power to make such movements at will is never lost under normal conditions of the central nervous system. In the case of convergence, however, it is difficult, though

not impossible, to converge the eyes without having some object to fix them on. It is very easy, on the other hand, to elicit these movements when there is an object of fixation, and rapidly to alter the degree of convergence as the distance of the object fixed is changed. But, unlike the associated similarly directed movements, convergent movements may be weakened or altogether lost independently of any cerebral change. They are elicited and controlled by the desire to maintain binocular fixation, which exists generally when both eyes have sufficient visual acuteness; they are more or less rapidly lost when one eye becomes blind or much impaired in its sight.

The eye muscles are practically never altogether slack; they are always, like other muscles of the body, in a state of at least tonic contraction. That their tone depends upon an innervation supplied from the different nuclei, or possibly transmitted through the nuclei from some other source, is pretty certain. Thus when the eyes are both directed straightforwards in what is called the primary position, *i.e.* with parallel axes in a horizontal plane, there is an innervation of the upward rotators, which is exactly balanced by an innervation of the downward rotators, and an innervation to rotation to the right exactly balanced by an innervation to rotation to the left. But if these innervational centres are constantly supplying tonic impulses, what of the convergent innervation? And how, if it also exerts a tonic influence, are the contractions, which would thus be caused, counteracted? It seems reasonable enough to infer that the counteracting innervation is one equally distributed between the right and left lateral rotators. This at all events would suffice. There is no reason, as I have elsewhere shown, to infer that there exists a separate divergence innervation.

All the centres involved in providing impulses to the eye muscles are thus in constant activity, except possibly in deep sleep and deep narcosis. But in connection with the counteracting influence of the two laterally rotating centres on the converging centre it is important to remember that part of the convergent innervation—the tonic innervation—is called for to cause parallelism; that, in fact, convergence starts, not from parallelism of the two axes, but from a certain degree of divergence. That this is the case is evidenced by clinical facts which will be afterwards referred to.

Now, although it is true that impulses received from the centres which provide for the associated movements of the eyes are always

equally distributed to the corresponding muscles of both eyes, there are certain conditions, which may either be pre-existent anatomically determined abnormalities, or may be artificially produced, which render this otherwise suitable arrangement not altogether suited for the purpose of binocular vision. The natural position of the eyes as the result of the disposition of their adnexa may be such that the equal distribution of the stimulus to vertical rotation, either tonic or active, does not suffice to effect a similar directing of their axes, and therefore secure the purpose of single binocular vision. Or a similar effect may be produced by a vertically deflecting prism held in front of one eye, by which the object looked at by that eye may appear to be higher or lower than it really is, and where it has consequently to be fixed by the other eye. Under these circumstances, when the difference in the latent position of the eyes, or the difference in level of the objects which are seen by each eye is not too great, they can be brought together in the interest of single vision. This results from the action of some higher centre known consequently as the centre for fusion. This centre exercises a dissociating influence on the innervation, which, acting alone, is only capable of transmitting an accurately associated impulse equally distributed over both eyes.

Efforts at fusion only take place where there has been developed a true psychical blending of the double retinal impressions, and consequently a true perception of depth, *i.e.* of the three-dimensional nature of external objects. Fusion under normal conditions, *i.e.* purely psychical fusion, is effortless. On the other hand, the dissociating of associated impulses by fusion innervation is felt more or less as an effort according to the extent to which it may be called into action and the degree of previous training which the existing circumstances have necessitated. When an individual is suddenly called upon to dissociate the equally distributed impulses to rotation in a vertical direction, it is rare that the amount of angular separation of images which can thus be brought together amounts to more than a degree or two ($1-2^\circ$), unless there is a considerable latent height difference—what is known as hyperphoria. Even this amount entails an appreciable effort. When the angular separation is greater the fusion effort is, as a rule, simply not made, and the result is binocular diplopia instead of binocular single vision.

In the case of lateral separation of the images fixed by each eye caused by laterally deviating prisms, or in the case of latent divergence or latent convergence of the two axes, fusion move-

ments take place with much less effort—often, indeed, without any appreciable effort at all. The reason for this is that the channel through which fusion acts in this case is a more definitely established one, viz., through the centre for convergence, the impulses from which are controlled so as to be greater or less, according to the particular requirements, in response to the innervation which that centre receives from the higher fusion centre.

For this reason, too, the diplopia due to a slight or disappearing abducens paresis is more readily overcome than a corresponding defect in the nerve supply to any vertical rotator. It is a fusion effort which prevents the tendency to diplopia in most cases of external rectus paralysis from asserting itself over the half of the fixation field which lies to the opposite side from that of the paralysed muscle. It is consequently only as a rule after the lapse of some time that the diplopia and strabismus over this area appear, as the result of the effort at fusion being abandoned, combined no doubt with the loss of tonic as well as active voluntary contraction of the paralysed muscle. It is easy to show by means of a vertically deflecting prism held in front of one eye, and thus producing a vertical diplopia, that an abducens paresis causes at least a latent convergence over the whole field of fixation.

When convergence becomes manifest over the whole field of fixation the condition is usually described as paralysis of the external rectus with secondary contracture of the antagonist. The term "secondary contracture" therefore implies that the internal rectus of the paralysed eye is alone in a state of increased contraction. The term is an unfortunate and misleading one, as all that has taken place is, that owing to insufficient response in the paralysed muscle to the counteracting or balancing innervation to lateral associated movement there is a necessary preponderance of the convergence innervation. No doubt the innervation to convergence may even become greater than it was under the normal conditions that existed before the one external rectus was paralysed, but it is always a question of convergence *innervation*, i.e. an innervation equally distributed between the two internal recti, not an isolated innervation of that internus muscle which happens to be the direct antagonist of the paralysed muscle.

This so-called secondary contracture of the antagonist—but really preponderating effect of convergence innervation—may disappear on the recovery of the paralysed muscle, or it may continue. The paralytic squint then becomes a concomitant one. And it is

because this may happen (I have only seen it do so in children) that we must assume that the convergence designated as secondary contracture may sometimes represent more than the mere preponderance of the purely tonic simultaneous convergence innervation which is supplied to the two internal recti. Otherwise it should not persist. In these cases over-convergence has become a *habit*, just as it is a habit in concomitant cases which have a more usual origin.

It is in connection with the fusion innervation—whether as in abnormalities connected with the lateral movements of the eyes the centre for fusion exerts its controlling power through the convergence mechanism, or whether the more feeble control then at the disposal of that centre is connected with the regulation of the vertical movements—that we meet with the tendency to the persistence of a constantly called-for state of innervation.

We may now consider some of these innervation habits. A condition which one used to see frequently, but which now, thanks to the much more general recourse to optical correction in myopia, has become very rare, is the one called *strabismus convergens a myopia*, or simply *strabismus convergens myopicus*. Those who have operated for this form of squint know how much more satisfactory the result is than in the commoner forms of convergent squint. This is because, except in excessive and long-continued cases, the patient is plagued by diplopia, from which he is at once freed after operation, whether or not the purely mechanical effect of the operation has equalled the amount of the squint. If it has, the operation alone has done all that is necessary; if it has not, provided always the mechanical effect is not too small, fusion steps in and does the rest. In such a case the fusion force acts by inhibiting or diminishing the convergence innervation. The explanation of such cases of squint was first given by von Graefe, and although his explanation has not everywhere met with acceptance, I have no doubt, judging from analogy alone, that it is a correct one.

When the eyes are kept for a long time continuously in convergence, as in reading or writing for several hours on end, there is sometimes experienced a difficulty all at once in resuming the parallelism of the axes which is necessary for single vision at a distance. This is particularly noticeable at night, *e.g.* on looking out at the street lamps, which consequently appear for a short time double. In this case there is a difficulty experienced, which is usually quite transitory, in freeing oneself all at once of the last trace of convergence. Some convergence, in fact, tends to persist

as the result of having been for so long active. The same difficulty does not occur so readily in the day time. This is because the number and clearness of surrounding distant objects induces a more powerful stimulus to fusion innervation. On the other hand the same stimulus is less potent in the case of moderately high degrees of uncorrected myopia. Consequently the tendency in such cases to the persistence of some convergence is greater. Objects at a distance are for a longer time seen double. The defective sight at a distance makes it less imperative on the individual to fuse the separated images into one, and he remains with a permanent degree of convergence. As time goes on not only the more distant objects, but gradually nearer and nearer objects, appear in double images, as the liberating of convergence becomes more difficult and more withdrawn from control, until finally, when the persistence of convergence has become an established habit, even near objects appear double, and a merely relative convergent strabismus becomes an absolute one.

This condition does not arise in the high degrees of myopia for the reason that, sustained binocular vision being practically impossible, convergence is never called for. In fact, the habit that is produced in high myopia is the very opposite in every way. Instead of causing a persistence of a state of innervation which is constantly called in play, it leads to a gradual cessation, more or less complete, of convergent impulses. This takes place first for the fixation of objects at the distance at which they can be sharply seen, *i.e.* at and within the far point of the less myopic eye, and afterwards for more distant objects. Thus there is produced a relative, and eventually an absolute, divergence.

Both the over-convergence in the first case, and the eventually complete loss of convergent power in the second, take place without any change whatever in innervation to associated similarly directed movements of the eyes. Consequently each internal rectus acts in association with the external rectus of the other eye exactly as it would do under altogether normal conditions. In the case of over-convergence, laterally directed movements take place in the same manner as they do when, in the absence of any squint, objects in a correspondingly near plane are fixed: whereas in the second case the lateral movements of the divergent axes are effected in such a manner as to maintain a constant angular separation between the axes, and this whether fixation takes place for objects lying in a distant or a near plane parallel to the eye.

Both the convergent squint and the divergent squint just referred

to are thus said to be concomitant. Although the term "*strabismus concomitans*" has long been used, it is often forgotten that concomitance can only occur, so far as lateral squints are concerned, when there is either an excess, or a too feeble degree, of convergence innervation, relatively to that which is required for binocular fixation on the plane on which objects engaging the attention lie. Another point that results from the fact that the cessation of converging efforts leads to absolute divergence of the axes, is that the position from which the eyes start at the beginning of convergence innervation is one of divergence (see page 402).

So far as the foregoing explanation goes it must be clear that the main distinction between the two forms of lateral concomitant strabismus is that the one is an *active* and the other a *passive* condition. This distinction is one which I have constantly emphasised on account of its bearing on operation.

A habit which has necessarily to be developed is obviously the habit of maintaining so much convergence innervation as is required to bring the axes parallel. Otherwise distant objects would not be seen binocularly. And as regards this habit, which starts very early in life, there are observable individual differences which doubtless depend, partly on optical conditions, leading to more or less intimate normal or abnormal connections being established between accommodation and convergence, and also on the pertinacity with which a habit once established is adhered to. The position of parallelism is usually maintained without any effort, and is retained even when the regulating influence of fusion is withdrawn by the occlusion of one eye. The deviations from parallelism that occur as a rule are only slight, even though the optical conditions vary very considerably. There may be either a slight degree of latent divergence, corresponding to a slacking of the convergent innervation, or a slight degree of latent convergence, showing that the uncontrolled tendency is towards some degree of convergence of the axes. If there were no tendency to persist in the convergent innervation, independent of the fusion stimulus, there should always be a latent divergence. And in point of fact a divergence usually asserts itself sooner or later when one eye has become blind. Nevertheless one may say, as already mentioned, that the constant necessity for looking straight has developed the *habit* of doing so.

The particular case of convergent concomitant strabismus to which I have referred above, though much less common as regards

its etiology than other cases, was selected to show how the habit of over-convergence, or of a degree of convergence in excess of the requirements of binocular fixation, could be gradually formed. In the more common cases of convergent strabismus the over-convergence, instead of first showing itself for distant fixation, does so for near, and eventually extends gradually or quickly, till it becomes absolute and not merely relative.

The explanation first given by Donders of accommodative convergent strabismus in hypermetropia is so well known and is so generally received as correct that I do not propose to introduce it further than to point out that while it accounts for the strabismus when accommodation is brought into play, it does not show why the strabismus should not disappear on the cessation of efforts at accommodation. As a matter of fact it can very often be found at an early stage in cases of hypermetropic squint that the deviation only occurs on accommodation. Where this is the case, common experience shows, too, that a permanent squint is prevented by the constant wearing of proper optical correction. Even where the squint has become permanent there can in almost all cases be shown to be some increase in the deviation associated with accommodation. In other words, we may distinguish between a permanent element and an accommodative element in the squint. At first, too, the permanent element is only small. As time goes on, and in this respect there are great individual differences, the permanent proportion increases. The constantly called-for convergence in excess of the normal requirements for binocular fixation, which characterises the accommodative squint, causes the persistence of some convergence—at first only a little, but gradually more and more. The *habit* of convergence becomes more and more firmly established, so that we have a permanently increased innervation to convergence. But inasmuch as the strabismus thus produced remains concomitant, the defect lies in the *innervation* and not, as is so often assumed, in the internal rectus muscle of the squinting eye.

If there can be an over-convergence innervation habit established, as we have seen in cases of myopia in which there has long been binocular vision, and in which therefore there should be a strong incentive to fusion efforts in order to avoid diplopia, it can easily be understood that, with the weakly developed binocular vision of very young children, with often defective sight in one of the eyes as well, the tendency to the convergent habit must be at least as strong.

In either case the habit may be prevented by optical correction. In the first case this acts by sharpening the distant sight and thus leading fusion to step in and prevent convergence being established for distance; in the second case it acts by preventing the accommodative over-convergence in near vision. When, however, in either case the habit has been completely established, optical correction is not so immediately useful. In either case it may succeed when as yet the permanent innervation excess is not too pronounced. Concave glasses in the case of myopic convergent strabismus will thus have their effect when the area of diplopia does not extend too close up to the eye. Convex glasses, too, will eventually lead to the cure of even a permanent hypermetropic convergent strabismus when the permanent element is relatively small, however marked be the accommodative element. But this usually takes time—often years—to complete. The bad habit, so to speak, has to be broken by a constant withholding of the conditions which originated it. When the habit has become sufficiently strong in either case recourse must be had to operation.

In practically all myopic convergent squints, and in a small proportion of hypermetropic ones as well, operation produces an immediate good result. Fusion at once is able to counteract part of the habit in the interest of binocular fixation and thus re-establish binocular vision, leaving only, it may be, a latent deviation.

I do not propose to discuss fully how the habit of over-convergence arises in all the different forms of concomitant strabismus convergens. In some the connection is not easy to trace. In the not uncommon cases of alternating strabismus, with good vision in each eye and emmetropia, one favouring circumstance may be a congenital or early-acquired absence of any tendency to fusion. Convergence in these cases would then be due solely to the relation existing between the associated impulses to accommodation and convergence, which, as I have elsewhere given experimental evidence to show, is different when freed from fusion control.

The really important point to remember is, that when the deviation is a concomitant one, it is always due to excessive convergence innervation. This etiology has an intimate bearing on treatment, as the over-action is also capable of disappearing in the course of time. It is, for instance, very much rarer to see adults, especially after the age of thirty or forty, with convergent strabismus than to meet with the same condition in children.

Partly, no doubt, this is to be accounted for by the number of cases in which suitable optical or operative treatment has been adopted; partly, too, it is due to the disappearance of a hypermetropia which induced the accommodative squint. But in addition there is a more or less pronounced tendency for the *habit* to be given up independent of such factors. It is not at all an uncommon thing to be told by patients that as they have got older their convergent squint has gradually disappeared. This, indeed, is very often found to be the case where one eye is amblyopic. On this account, too, it is not advisable to produce too great an effect by operation in children. When that has been done there is often found later on to be a divergence to take the place of the previous convergence. The reason of this is that the operation has only a mechanical effect, leaving the condition of innervation at the time unchanged. Thus when convergent innervation which at the time of operation sufficed to produce parallelism becomes less forcible, a divergence of the axes is the result. In this respect advancement of one or both external recti is preferable to tenotomy of one or both interni. It is undoubtedly less likely to be followed by divergence.

The illustrations which have been given so far of persistence of innervation, which may or may not be suited to the requirements of binocular vision, have had to do with convergence innervation alone. Other instances of persistence are met with in connection with the acquired association between convergent and other impulses. The most important to understand properly are the associations of convergence and accommodation. Starting with emmetropia on the one hand, and parallelism of the visual axes on the other, that is to say, with the physiological or tonic position of rest (not the anatomical position of rest, which is a quite other one), the ideal connection between these two impulses is such that an accommodative effort of any definite amount should correspond to a convergence effort of the same amount. Accommodation for a point at a distance of $\frac{1}{4}$ metre from the eyes would thus be associated with convergence on the same point. Otherwise expressed, this is to say that with, *e.g.*, 4 dioptres of accommodation there is associated $\frac{1}{4}$ metre angles of convergence: or generally with every dioptre of accommodation there is associated 1 metre angle of convergence. This ideal connection is the rule in emmetropia, so that even on the occlusion of one eye, so as to cut off the fusion control, the accommodation and convergence are found to be practically equal. But there are many

exceptions to this. It is not uncommon to find on the one hand that the convergence tends to lag behind accommodation, leading to relative latent divergence, and on the other hand, though less frequently, that it tends to be greater than the accommodation, and thus causes relative latent convergence. What should be remembered, however, in every case is, that whether the adjustment of the axes remains perfect or not on occlusion of one eye, we have only to deal with the states of *associated accommodative and convergent innervation*, not with anything depending upon the muscles themselves. This is often, and indeed generally, forgotten. The terms exophoria and esophoria, so often used, are unfortunately associated with the idea of preponderating strength of the externi or interni muscles themselves. Still more unfortunately this erroneous conception leads to a lot of quite uncalled-for operative interference.

No doubt, although the associated relations between the two impulses in question are, for the most part, those which the regulating influence of fusion has caused to be established as a habit, inasmuch as they tend to persist in the manner in which they are constantly being used, there is a degree of association which is independent of, though controlled by, fusion where binocular vision exists. Just as there is elicited an impulse to pupillary contraction along with accommodation, so there exists an associated impulse to convergence. It is fortunate, however, that this association in the action of contiguous nuclear centres in the brain is not so intimate as not to admit of being controlled by the higher fusion centre in a way which brings the effective relationship into a correspondence which suits varying conditions. I have elsewhere shown experimentally that, when not subject to the control of fusion, the impulses are so closely associated as practically to correspond to what has been referred to above as the ideal association. What I wish here to call attention to is that the interference in this natural relationship, which is effected by fusion, not only introduces another relationship which is suited to the particular circumstances of any case, but that the relationship so caused persists more or less completely as a habit of innervation. If, for instance, the natural tendency for the impulses to accommodation and convergence were uninfluenced by fusion, then it would be impossible for a hypermetrope or a myope to accommodate accurately without squinting. And on the other hand, if the controlling influence to which these naturally associated impulses were subjected by fusion innervation did not tend to

become an established habit, then latent relative deviation would be constant and of a degree corresponding to the ametropia which existed in each case.

The habit engendered by this constantly called-for dissociation of the two naturally associated impulses introduces conditions which are of practical importance. It has to be taken into consideration, for instance, in the correction of ametropia, particularly if this is begun after childhood. A myope, the measure of whose convergence has hitherto been necessarily greater than that of his accommodation, when suddenly called upon to use correcting glasses has to effect all at once a complete change in the acquired relation between convergent and accommodative impulses. This may be so difficult, and cause so much discomfort, that he is compelled either to forego the correction or at least to start with something less than the full correction. But so great is the power of fusion in most cases that this result is not nearly as common as might be expected. On the other hand a hypermetrope, who has habitually accommodated in excess of convergence, and whose strong fusion power has enabled him to escape an internal squint, will in all cases resent more than a partial correction of his defect to begin with. Thus, in practice, only the manifest hypermetropia can, at first at all events, be advantageously corrected.

The question of operative interference only comes in when habit has not been so firmly established. Thus a very pronounced latent divergence, when associated with an inconvenient degree of convergence insufficiency, can be put right, often with appreciable benefit, by operation. But here it is essential to success that there should be a sufficiently marked latent divergence for distance; otherwise the effect of operation will be to convert a latent divergence for near into a manifest convergence with diplopia for distance. I have seen the disagreeable mistake of not attending to this point made a good many times.

We may next consider the acquired association between convergence and downward rotation of the eye. Whereas the external objects, at which one looks when the eyes are turned upwards or to either side, in or near the horizontal plane which passes through them, are mostly objects at some distance more or less great, it is otherwise when looking downwards. Under the ordinary conditions of life, and in reading or writing, it is necessary to associate more or less convergence of the axes with their downward rotation. This habitual association tends consequently to persist even when

binocular vision has, from any cause, become impossible, or when unusual conditions present themselves. Thus it is a well-known symptom of an abducens paralysis to find a greater amount of homonymous diplopia for the fixation of objects (whose lateral angular separation from the middle line is the same) in the lower than in the upper part of the field of fixation. When disappearing, too, the power of fusion to overcome the diplopia is found to be greater on looking up than on looking down. This is due simply to the habit of associating convergence with downward fixation, which is thus seen to persist.

Again, many people experience a considerable degree of discomfort, which may even amount to a feeling of insecurity, on looking straight down from a height. This is most noticeable if the head is not bent forward at a right angle. The feeling can be overcome, or at least greatly diminished, by holding prisms of 1°, with the bases outwards, in front of each eye. Part, at least, of the discomfort is thus shown to be connected with the effort which has to be made to counteract a habit of association between convergence and downward rotation. In regard to this symptom there are individual differences. Looking downwards, with the axes brought into parallelism without any effort, becomes, of course, easy and natural enough in those whose occupation frequently calls for their doing so. This is, however, an influence which makes for counteracting the usual habit. In other people something, no doubt, depends upon the latent position of the eyes for distance—a position which, as I have shown, is not necessarily the same for different directions of distant fixation. One would expect—although I have not had an opportunity of confirming this—that in cases in which the distant latent position is one of divergence the discomfort on looking down from a height would be absent or less, whereas the opposite would apply to those with latent convergence. In the majority of emmetropes the tendency is towards some—usually a slight degree of—divergence. Only in those who are very constantly reading, writing, or using their eyes otherwise directed on near objects is the tendency the other way. But, as stated above, the habit formed in all cases is mostly such as to amount, practically speaking, to a latent parallelism; it is comparatively rare, that is to say, that the deviation from parallelism in either direction is very pronounced.

When we come finally to the habits which may be formed in connection with the manner in which convergence and lateral rotation of the eyes are associated, there is not much of practical

importance to be noted. On the other hand, there are points of physiological interest which are very subtly illustrative of the main subject of this paper, and which, so far as I know, have not hitherto received attention.

Let us consider what is the most common manner in which the requirements of binocular vision lead us to make use of our power of convergence. For objects lying beyond 10 feet from the eyes there is practically no convergence of the axes required. We have therefore to deal more with the state of matters as they exist when we are occupied with the fixation of near objects, and, particularly in civilised life, with, *e.g.*, the writing or print of a letter or book which lies before us. A little consideration of elementary geometry makes it obvious that as we pass our eyes along a printed line from its centre to either side, whilst the lateral rotation continuously increases in amount, the convergence, on the other hand, continuously diminishes. Thus, beginning at the left-hand side of a page, the converging effort gradually increases until we come to the middle of the page, and then gradually diminishes as we pass to the right-hand margin. This applies, of course, exactly, only to one position of the book; but whatever the position, a constant change in convergence is necessary. A definite *habit* in the association of convergence and lateral movement is thus established. This habit, doubtless, is not so strong but that it can be overcome readily, and without appreciable effort, by fusion. We, for example, experience little or no difficulty in reading when a page is held slantingly, or curved, or even irregularly crinkled. In order that convergence on lateral movement should remain constant in amount it would be necessary for the objects successively fixed to lie in a circle which also passed through the centres of rotation of each eye, which is not at all their usual disposition.

There is one not very common pathological condition which clearly shows that this habit in the association of near convergence and lateral movements persists, even when the fusion control is lost: this is the condition of *spasm of convergence* causing convergent squint with diplopia. The spasm usually lasts from a few hours to a fortnight or more. In my experience the symptoms have generally passed off within a week. Recently I saw such a squint occur in the case of a young woman of twenty whom I had known all her life, and who had never shown even a trace of latent convergence. The circumstances were so unusual that they may be incidentally referred to here. For the purpose of having a slight operation performed for dysmenorrhœa she was anaesthetised

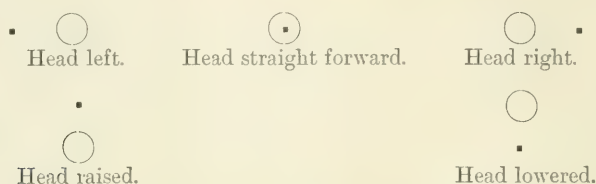
with chloroform. Some little difficulty was experienced with the anæsthetic. When she recovered, the pulse was intermittent and she complained of diplopia. The diplopia was homonymous and due to a most marked degree of convergent strabismus. As I had an opportunity of examining her at once, I was able to diagnose a spasm of convergence. This gradually subsided, and disappeared entirely after seven hours. Neither the surgeon nor the anæsthetist, both Edinburgh men, had seen a similar case, nor was I able to find any record of such in ophthalmic or anæsthetic literature.

The particular point, however, to which I wish to draw attention in connection with the subject of innervation habit is, that although the centre for convergence in these cases is in a state of abnormal irritability, the *habit* of association with lateral rotation is maintained. The diplopia is always, so far as my experience goes, greatest straightforwards and diminishes to either side. The lateral diminution is quite slight and exactly consistent with the diminution in convergence which takes place under normal conditions and when associated with eye movements from side to side. It is, in fact, the expression of the persistence of the habitual way of associating near convergence with movements of the eyes laterally. This characteristic of the diplopia in cases of spasm of convergence has been noticed and referred to by others. The explanation of it was, however, first given, so far as I am aware, by myself.

In cases of double externus paresis, which are also of rare occurrence, the exact opposite takes place. The separation of the homonymous double images increases on fixation to either side. The symptom is thus one of importance in the differential diagnosis of these two conditions.

An interesting case of persistence of acquired habit, not, however, as in the case just mentioned, normal in its nature, came under my notice two years ago. A very intelligent young man who, contrary to my advice, had been for three years or more constantly wearing spectacles to correct a right unilateral myopia of six dioptries, noticed that on taking off his spectacles he saw double when he rotated his eyes some distance to either side. This did not inconvenience him much, but, being observant and well-informed, it not unnaturally caused him some alarm. On examination I found that he had, in fact, homonymous diplopia on looking to the right, and crossed diplopia on looking to the left. I explained to him the nature and cause of his symptoms, and having

reassured him as to the absence of any gravity connected with them suggested to him that he should study them closely in a systematic way, explaining to him how he might do this. I received from him some days later such an excellent and complete account of the result of his own tests, that I cannot do better than quote some of his remarks in his own words:—"If the image of a candle, as seen by my right eye without spectacles, be represented by a circle, and that seen by my left eye by a dot, then their movements on turning my head from side to side, and on moving it up and down, are a little like this—



These diagrams merely denote the direction; but I fancy that in whatever direction I turn my head the difference between the images is about the same for the same amount of turning.* As the head is moved round in a circle the image of the right eye also moves in a circle round the image due to the left eye, being, so to speak, always at the other end of a diameter from the head. For lateral movements of the head I can make the images coincide at will, but unless a special effort is made they draw apart. For up and down movements I can make the images draw a great deal nearer, and could probably make them coincide, but shall not try. On first getting the spectacles I used to see double, but the images could also be brought to coincide by a separate effort of will, of which effort I was conscious each time it was made. On turning the spectacles so that the left lens is over the right eye, and conversely, the movements of the images corresponding to each eye are in the same direction as in the diagram, but about twice as great. These observations seem to me to indicate (1) that rays parallel, or nearly so, before passing through the lenses, used obliquely, are not parallel after passing them; (2) that my eyes compensated for this bending of the rays by a movement akin to squinting; (3) that this compensation, at first applied with a conscious mental effort, has become, through three years' use, unconscious and automatic, so that (4) when the glasses are

* Obviously a correct observation, as with a spherical lens the prismatic effect would be the same all round at equal distances from its centre.

removed the automatic squinting or compensation, or whatever you care to call it, still goes on, causing me to see double."

The condition could hardly have been more clearly analysed by a trained physiologist.

That such diplopia, which must undoubtedly be acquired in other cases of corrected anisometropia, should not be more frequently noted, is due no doubt to the fact that it is rare for anyone whose one eye is emmetropic to choose to wear spectacles for distant vision. Besides, in anisometropia, with the optical defect considerable in both eyes, the symptom, except in peculiarly observant individuals, would not likely attract attention, or, at least, merely be looked upon as one of the indistinctnesses of vision which might be expected to be associated with uncorrected ametropia. It is well known that anisometropes do not readily accept full correction of the more defective eye if the difference in degree of the ametropia in the two eyes is considerable. Though certainly not the only cause of this objection, it is not unlikely that one cause may be the altered relations in associated movements which correction must entail.

It will be noticed in the description given by the patient himself in the case cited above that while the diplopia on looking upwards and downwards without glasses was of the same amount as that of the lateral diplopia, still he observed a greater tendency for it to persist. This is in accordance with the fact that fusion is much less powerful to correct vertical deviations than lateral ones, for which easily regulated degrees of convergence is all that is required. The circumstances of the case show that the separation of the images cannot have been greater than what would be caused by a prism of 3° to 4°. In the absence of any pre-existing hyperphoria (evidenced, if the patient's observations were correct, by the equality of the deviations on looking either upwards or downwards through the same angle) the degree of departure from complete similarity in the amount of vertical rotation of the two eyes must have been caused by efforts of fusion overcoming the effect of the glasses. No doubt, therefore, the same power of fusion should be able to, and in the course of time would, overcome the diplopia also. What stood in the way of this was simply the acquired *habit of innervation*.

The question as to how fusion acts in dissociating the associated vertical movements of the eye is a difficult one. As it has no direct bearing on the subject of this paper, I do not propose to attempt an explanation of it here. In any case I could offer no

experimental or clinical evidence of the correctness of the views I hold. It must be remembered, however, that whereas, as a rule, the regulating power of fusion in this respect is very limited, this is not always so. Sometimes, indeed, an individual, one of whose eyes when staring vacantly may be directed very markedly upwards, will bring it down to the level of the other when his attention is called to the fixation of any definite object.

In the remarks which have preceded I have called attention to the completeness of the association of the two eyes in lateral movements, whether equally directed or opposed as in convergence, a completeness which suggests an innervation passing from either the same cells, or at least very intimately related cells, in the respective nuclei. I have also referred to another form of association which is due to the interdependence of innervations which arise in separate centres. The vertical associated movements are probably not exactly similar as regards their innervation to those of either category. Their innervation, however, along with the other interdependent innervations, are subject to control by fusion in the interest of varying requirements to insure binocular fixation, and thus maintain true or psychical binocular stereoscopic vision. The action, too, of this controlling force, as I have attempted to show, has the effect of creating innervation habits which may or may not be useful. Some of these habits are only of physiological interest; others are of importance in diagnosis, and if better understood would prevent many mistakes which are at present made in regard to treatment.

ECLAMPSIA IN THE EDINBURGH MATERNITY HOSPITAL, WITH SPECIAL REFERENCE TO ITS SEASONAL INCIDENCE.

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THE present communication is concerned with the toxæmic syndrome of pregnancy expressed in eclampsia, and especially with its incidence in the Edinburgh Royal Maternity Hospital. The record extends over a period of twenty-two years—from 1890 to 1911—and presents the statistics of the hospital during that time, in so far as they are concerned with eclampsia, and especially with its seasonal incidence.

During these twenty-two years there have been delivered in the Maternity Hospital 8445 women, and eclampsia has occurred in 238 cases. It follows that out of a total of 10,000 deliveries there would have been 282 cases of eclampsia, which works out at 2.82 per cent., or, to put it more strikingly, one case of eclampsia in every 35 deliveries.

This is very different from the incidence of eclampsia generally, because it is estimated that it occurs four times in every 1000 labours or once in 250. To take the Maternity Hospital figures as an indication of the frequency of eclampsia generally, would be just as absurd as to take the death-rate of the Royal Infirmary as an indication of the death-rate of the community generally. It is therefore impossible from these statistics to estimate the frequency of its occurrence in Scotland generally, and we get no light on this point from the Registrar-General's Reports, which record only the fatal cases. Further, in judging the hospital figures we must remember that the disease is largely a disease of town life. Many practitioners there are in the country who have had a large obstetrical experience and who have never seen a single case of eclampsia. I can instance two examples of men who have delivered between two and three thousand women and never had a single case of the sort.

All the statistics we have, therefore, both at home and abroad, are presumably misleading in regard to general incidence, in that they are based wholly upon hospital records.

It is a curious and rather interesting fact that during the eight months from December 1886 to August 1887, a period antecedent to this investigation, not a single case of eclampsia was reported, and this is the longest interval in the records of the hospital.

The age incidence varies from 16 to 45, with an average of 25 years. This practically bears out the experience of other hospitals, where there is usually a preponderance of young primiparae.

Of the cases under discussion 175 were primiparae, 66 multiparae, maintaining the well-known average of three to one. 134 occurred before term, 63 at full term, and 44 post-partum.

The next question which naturally presents itself is—Is this disease on the increase or not?

The first table to which I draw attention incontestably goes to prove that it is on the increase. The table shows that not only has the disease increased from 4 to 30 per annum in 22 years, but it shows a sudden rise in the year 1899, and this rise has been

TABLE I.

THE TOTAL NUMBER OF DELIVERIES DURING EACH OF THE YEARS 1890 TO 1911, AND THE CASES OF ECLAMPSIA OCCURRING IN EACH, ALONG WITH THE RATIO PER 10,000.

Year.	Total Cases.	Cases of Eclampsia.	Ratio. Column (3) Column (2) $\times 10,000$.
(1)	(2)	(3)	(4)
1890	226	4	177
1891	298	5	167
1892	310	7	226
1893	283	4	141
1894	306	5	163
1895	329	4	122
1896	359	5	139
1897	340	3	88
1898	350	3	86
1899	331	12	363
1900	345	6	174
1901	303	9	297
1902	319	12	376
1903	374	10	267
1904	360	11	306
1905	406	13	320
1906	405	15	370
1907	460	14	304
1908	512	16	312
1909	631	28	444
1910	597	30	303
1911	601	22	366

persistently maintained. As the table also shows that there was no abrupt increase in the total number of cases admitted, the sudden rise of cases of eclampsia in 1899 is all the more striking, and its persistent maintenance calls for examination. It is further interesting to observe that in the three years previous to 1899 the number of cases in hospital was slightly larger, and yet in that particular year the ratio rose from 86 per 10,000 to 363 per 10,000. I am unable to offer any explanation of this sudden rise in that particular year. On consulting the meteorological tables I find no specific change in that year so far as seasonal conditions are concerned, and during that particular year the cases were spread with exceptional regularity over the whole twelve months.

Taking the cases as they stand, it might appear unfair to deduce an increased incidence of the disease, because while the disease has increased, the actual number of cases delivered in the hospital has also increased. To make it still more clear—

because one year is too little to judge from—I have taken groups of years, and it is evident from these tables that the disease is gradually and steadily increasing. I have first divided the

TABLE II.

SHOWING INCREASE OF ECLAMPSIA IN FIVE GROUPS OF YEARS.

Years.	Total Cases.	Cases of Eclampsia.	Ratio.
			Column (3) Column (2) 10,000.
(1)	(2)	(3)	(4)
1890-1894	1423	25	176
1895-1899	1709	27	158
1900-1904	1701	48	282
1905-1909	2414	86	356
1910-1911	1198	52	434

TABLE III.

SHOWING INCREASE OF ECLAMPSIA IN FOUR GROUPS OF YEARS.

Years.	Total Cases.	Cases of Eclampsia.	Ratio.
			Column (3) Column (2) $\times 10,000$.
(1)	(2)	(3)	(4)
1890-1899	3132	52	166
1900-1904	1701	48	282
1905-1909	2414	86	356
1910-1911	1198	52	434

period concerned into five groups of four years, and this shows an increase from 176 per 10,000 to 434 per 10,000. The number of cases in the hospital has nearly doubled itself in these 22 years, and the eclampsia incidence has more than doubled itself as well. This is a fact which I think is absolutely beyond dispute, and this, I gather, conforms with the experience of my colleagues.

To explain the cause of the increase of eclampsia is somewhat difficult. We shall see later on that the disease is much more common in towns than in the country, but I have no statistics to show whether it is increasing in the country or not. The point is to explain its increase in the Maternity Hospital, not only absolutely but relatively. This I attribute, firstly, to clearer views entertained as to the toxæmia of pregnancy. Consequently patients

are sent in sooner, whereas in former days the conditions were not recognised until the actual explosion took place and the woman was too ill to be removed. Secondly, it is becoming better recognised that, as eclampsia is entirely the result of pregnancy, the sooner the uterus is emptied the better. For this reason again the women are sent in sooner. I have not burdened this paper with the statistics of it, yet in looking over the recent years I note that quite a number of women have been sent in in the pre-eclamptic stage, a condition which was not observed nor reported on in the earlier records. Thirdly, I am disposed to think that the difference in diet may be a very important factor. There can be no question at all that this disease is less common in the country than in the town, and it seems to my mind that the dietary of country women compared with that of town women accounts, to some extent at least, for this. The dietary of a woman in the country is to a very great extent of a carbohydrate nature, such as porridge, bread, vegetable soup, and tea, and until comparatively recent years it was very much the same in the city.* But during the years over which this investigation stretches, the conditions of dietary amongst town people have altered considerably, and become much more complicated. The eating of nitrogenous foods has increased, owing to the fact that meat is to a very large extent imported from abroad, and tinned foods are becoming much more common and much cheaper than formerly. These enter greatly into the dietary of the town women nowadays, and seem to me to offer a partial explanation at least of the steady increase of this disease.

Of course during the time covered by this report the influx of people from the country to the towns has been extremely marked. It may be urged that we have a considerable proportion in the Maternity Hospital from the country, but the majority come not from the country but from the populous mining districts, where the city conditions practically obtain. Rural districts have, in many cases, less than half the population they had, while, on the other hand, many cities and towns have enormously increased, and large communities have sprung

* Since writing the above, my attention has been drawn to the discussion on eclampsia at the British Medical Meeting, and there I observe that Mrs. Sharlieb refers to the frequent occurrence of eclampsia in Madras, and specially points out that the dietary of the native there is mainly rice, and there is no consumption of flesh food or alcohol.

up in mining districts. This is certainly the case in and around Edinburgh.

Another question obviously arises out of this. If the disease is so markedly on the increase, is it becoming more or less severe? The only means at our disposal of deciding this question is by an investigation of the mortality, because it is perfectly legitimate to conclude that if the mortality is increasing along with the

TABLE IV.

THE NUMBER OF CASES OF ECLAMPSIA DURING EACH OF THE YEARS 1890 TO 1911 AND THE CORRESPONDING DEATHS ARE AS FOLLOWS:—

Year.	Cases of Eclampsia.	Deaths.	Ratio of Mortality Per Cent.
1890	4	3	75.0
1891	5	2	40.0
1892	7	6	85.71
1893	4	3	75.0
1894	5	...	...
1895	4	2	50.0
1896	5	4	80.0
1897	3	2	66.67
1898	3	...	...
1899	12	5	41.67
1900	6	4	66.67
1901	9	3	33.33
1902	12	2	16.67
1903	10	3	30.0
1904	11	6	54.55
1905	13	4	30.77
1906	15	4	26.67
1907	14	6	42.86
1908	16	4	25.0
1909	28	11	39.28
1910	30	7	23.33
1911	32	9	40.91

general incidence, the cases are becoming correspondingly more severe. The question resolves itself therefore into the mortality table. It will be observed in Table IV. that there is a very marked decrease in the number of deaths. A glance at this table fails to give one an exact impression of this, but, on the other hand, if the ratio of the mortality per cent. is observed, the fall in the death-rate will be more obvious. But it is still more accurately brought out when the years are taken in groups, and a reference to Tables V. and VI. will show that

TABLE V.

SHOWING DECREASE IN MORTALITY IN FIVE GROUPS OF YEARS.

Years.	Cases of Eclampsia.	Deaths.	Rate of Mortality Per Cent.
(1)	(2)	(3)	(4)
1890-1894	25	14	56.0
1895-1899	27	13	48.15
1900-1904	48	18	37.5
1905-1909	86	29	33.72
1910-1911	52	16	30.77

TABLE VI.

SHOWING DECREASE IN MORTALITY IN FOUR GROUPS OF YEARS.

Years.	Cases of Eclampsia.	Deaths.	Rate of Mortality Per Cent.
(1)	(2)	(3)	(4)
1890-1899	52	27	51.92
1900-1904	48	18	37.5
1905-1909	86	29	33.72
1910-1911	52	16	30.77

the ratio of mortality per cent. has fallen from 56 to 30 in the first group, and from 51 to 30 in the second. Therefore, so far as we can estimate the severity from the death-rate, it is apparent that, since in Edinburgh the mortality is decreasing, the severity of the cases is likewise decreasing.

Härzfeld in Vienna, reviewing 18,000 post-mortem examinations performed in Vienna Pathological Institute, found 81 autopsies on eclamptic patients. These 81 fatal cases corresponded to 463 cases of eclampsia which were observed in the three Obstetrical Clinics of Vienna, out of a total number of 9600 deliveries.* He was of opinion that the mortality of eclampsia had become more favourable. Up to eleven years previous to 1890 it stood at 25, and in 1901 and the years following it had fallen down to nearly 20.

In 1901 Olshausen expressed the opinion, although he did not supply any statistics, that on the whole the Berlin clinics showed

* It would thus appear that out of a total number of 9600 deliveries there were 463 cases of eclampsia, which is at the rate of 4.8 per cent., *i.e.* 1 in 21. It would also appear that out of these 463 cases of eclampsia there were 81 fatal cases, which is at the rate of 17.5 per cent., *i.e.* 1 in 6.

a slight increased mortality. Schatz shortly after arrived at a totally different conclusion, and in his report he endeavoured to show that the death-rate was increasing. But I am now dealing with Edinburgh only.

In judging the mortality the question is—Has the type of the disease changed? So far as the Edinburgh Hospital is concerned, I do not think it has. Going over the records I find that the mortality is very equally distributed, and an examination of the cases recorded in the journals of the hospital does not show that the type of the disease has in any way altered either in the number of fits which occur, in the duration of the fits, or in the depth of the coma. Serious and simple cases seem to be scattered over the period in a similar ratio. Therefore I am driven to explain the diminution of the mortality in two ways—firstly, because the cases are diagnosed and sent in earlier than they used to be, and are therefore more responsive to treatment; and secondly, by an alteration in the treatment itself.

With an improved diagnosis one naturally expects to find improved treatment. Not only so, but as there is no theme in obstetrics upon which more time and more careful study have been bestowed than upon eclampsia, one would gladly hope that this time and study have not been thrown away, and that the decreased mortality might be due to the improved treatment.

While this is to some extent the case, and while various methods of dealing with the disease are probably accountable for sporadic improvements here and there, yet it must be admitted that we possess no medical or surgical methods which offer any constant lines to follow. On looking over the hospital reports during these years it is obvious that there have been changes in the methods of treatment, but while in one service operative interferences are more common than in another, yet, taking it all over, the treatment during these many years has been practically on the same lines. Sometimes it is apparent that one of the officers in the hospital has inclined in a particular direction during the quarter of his service, but there is no continuous treatment on any particular lines, which is perhaps one of the advantages or disadvantages of there being no continuous service in the hospital. Perhaps my colleague, Dr. Ballantyne, has had exceptional success with saline treatment, but that does not fall to be discussed here.

During the years over which this investigation extends, every possible method, surgical and medical, of dealing with the com-

plication, with perhaps the single exception of the removal of the mamma, has been tried. The hospital records bear ample testimony to the care with which these varying methods have been tried, adopted, or discarded, and it may be that as the condition is due to pregnancy and pregnancy alone, the essential feature in treatment should be the interruption of pregnancy. This certainly ought to abolish the fits, and indeed usually does so, although it need not necessarily cure the patient. There can be no doubt whatever, as I gather from the statistics of our own hospital, that the shorter the time between the first convulsion and the delivery in ante-partum cases, the better the prognosis for both the mother and child.

It must be kept in view that many deaths are now avoided by more efficient and continuous actual watching and nursing, such as keeping the fauces clean by unremitting sponging with a handled sponge, by artificial respiration carried out for hours if necessary, by hot compresses, thorax packs, and, in very restless patients, by the use of morphia, and by the free use of salines hypodermically and per rectum. It is further a fact that a great many cases sent to hospital are suffering from complications apart altogether from eclampsia, such as pneumonia or pulmonary oedema. In these cases probably any attempt at cure would be foredoomed to failure, and death ought not to be credited to eclampsia. But if we add to this the fact that surgical interference is now very much more commonly practised than previously, for example various forms of *accouchement forcé*, especially vaginal hysterotomy, I think we should have some explanation why, although the disease is increasing, the mortality is decreasing.

In looking at the etiology of eclampsia, and in considering the innumerable theories that have been propounded to explain its occurrence, one finds here and there a reference to its incidence with greater frequency at one season than another. Although this suggestion is an old one, it is only within recent years that the matter has received any serious attention at all, and that almost entirely in Germany.

Up till quite recently, then, the influence of the seasons on eclampsia was simply a pious opinion, although Olshausen denied always that the accumulation of cases depended on the weather. The connection between weather conditions and eclampsia has been frequently enough commented on, but authors have shown a remarkable diversity of opinion in their estimate of the question.

As a matter of fact up till 1900 nothing of any moment was written on the subject. I have examined what has been written on the subject and approach it with a perfectly open mind.

In 1900, at a meeting of the Gynaecological Society of Berlin, Zangemeister, in discussing the causes of eclampsia, stated that a supposition had been expressed that the states of the weather might exercise some influence on its origin. He found on the whole that the incidence of eclampsia was greatest in the months of June and July, and that in November there were fewest births, and likewise also absolutely and relatively fewest cases of eclampsia.

Month.	Total Cases.	Cases of Eclampsia.	Ratio, Column (3) Column (2)
(1)	(2)	(3)	(4)
January	295	15	508
February	262	12	458
March	294	11	374
April	284	16	563
May	279	10	358
June	281	17	605
July	259	16	618
August	287	16	557
September	240	9	375
October	258	10	388
November	226	8	354
December	274	10	365

1. July. 2. June. 3. April. 4. August. 5. January. 6. February.
7. October. 8. September. 9. March. 10. December. 11. May.
12. November.

He also exhibited a table giving an account of the frequency of eclampsia, which table is appended.

The first three columns of Zangemeister's table are exactly as he published it. I have added a ratio column per 10,000, which shows the incidence more definitely; and I have further added the months in sequence as the disease occurred; and, lastly, I have taken the cases and grouped them in seasons.

It is apparent, therefore, beyond question, that eclampsia preponderates in the months of June and July, and that, speaking generally, eclampsia tends to increase as the weather gets warmer, and to decrease as the weather gets colder. This is Zangemeister's contention.

At a meeting of the same congress next year Schatz, from an examination of the cases in the Duchy of Mecklenburg, which is mainly a rural district, for a period of five years, found that the preponderance of cases was in the summer months—from May to October—and he explained this by the fact that pregnant women in the country rarely go out in winter, and are therefore not exposed to changes of temperature.

Dührssen has in general terms enunciated the following:—that in damp cold months an accumulated number of eclamptic cases come under observation, because of the unfavourable influence that damp weather has on kidneys already diseased.

Season.	Total Cases.	Cases of Eclampsia.	Ratio.
			Column (3) Column (2) $\times 10,000$.
(1)	(2)	(3)	(4)
November, December,			
January	795	33	415
February, March, April .	840	39	464
May, June, July	819	43	525
August, September,			
October	785	35	446

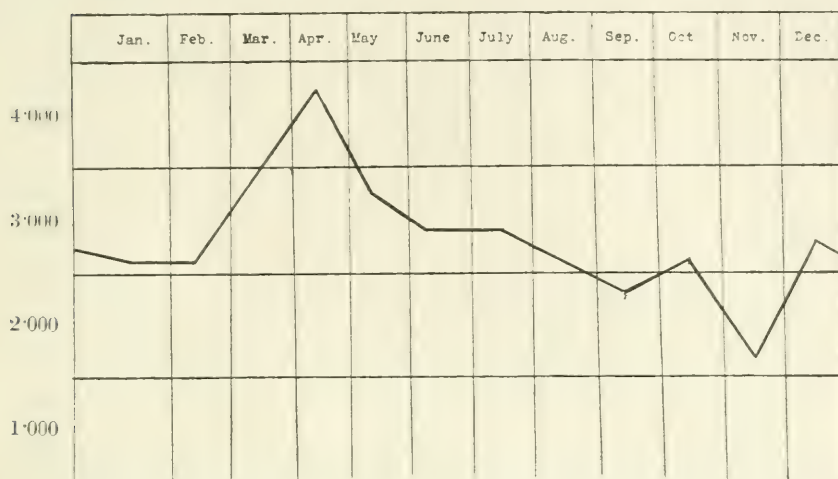
Zangemeister, as we have seen, found the disease more frequent in the warm thundery summer months than in the winter, a phenomenon which he is inclined to connect with the increase and sudden suppression of the sweat secretion.

Meyer-Wirtz in 1904 examined a series of cases regarding the influence of the weather as a meteorological factor in eclampsia, and came to the conclusion that there are no certain grounds to go on for connecting the influence of the weather with the cause of eclampsia.

Pomy, in Göttingen, found that in the months from October to February the least number of cases of eclampsia occurred.

A very short but extremely interesting paper is that of Harrar. He collected the cases occurring within ten years in New York, and produced the chart which I present. In this chart it will be seen that the rise occurs in February and attains its highest level in April, slowly declining to the lowest point in November, which, although by no means a month of equable temperature, is one of very low rainfall in New York. The curve, therefore, so Harrar says, as nearly as possible corresponds with the curve of the rain-

fall. As will be seen from this chart, between these two months, November the lowest and April the highest, there is a very regular gradation of cases.



Harrar further draws attention to the fact that in plural births eclampsia is very common. This, of course, is common experience,

PLURAL BIRTHS.

	Total.	Primiparae.	Multiparae.	Plural Births.
Confinements . .	6286	3206	3080	92
Eclampsia . . .	150	95	55	10
Frequency . . .	1:42	1:34	1:55	1:9
Per 100 cases . .	2.39	2.92	1.80	10.86
Deaths	54	33	21	2
Mortality per cent.	36	34	38	20

but his table shows the interesting fact that the mortality in such cases is small. This coincides with the results of the Maternity Hospital here, although the numbers are so small that they are scarcely worth making into a table.

McPherson, in a paper in 1899, reported 250 cases from the lying-in wards of the hospital in New York, and he found the greatest number of cases in February and March, and the least in December and January, which in a modified degree corroborates Harrar's statement.

It is somewhat curious that Schlichting's table, which I introduce, and which represents a record of only four years, shows the maximum in April, just as Harrar found in New York; but from the very short period over which the examination extends, one cannot attach very much importance to it.

SCHLICHTING.

January	22	July	18
February	18	August	23
March	22	September	24
April	33	October	18
May	30	November	16
June	16	December	23

Hammerschlag, discussing a series of 291 cases of eclampsia occurring in East Prussia, arrived at two conclusions, namely, that there is no connection between the weather and eclampsia, and secondly, that eclampsia is decidedly rarer in the country than in the city.

Otto Büttner, at Rostock, made a very serious contribution to the discussion of this subject, and he found, to take one example, that in the five months from November 1890 to March 1891, which interval of time corresponded to 7500 births, only two cases of eclampsia occurred, while in the next five months there were 19 cases, or one in 400 births. He also found that the *fewest* number of eclampsias occurred in November.

Büttner rather minimised the relation between seasons and eclampsia, but in a subsequent paper he referred to the matter, and found that the fewest cases of eclampsia, both in town and country, occur in November, as the accompanying table shows:—

BÜTTNER.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.
Town . .	14	13	14	23	16	19	16	11	15	21	11	22	195
Country . .	8	9	6	17	9	13	13	12	19	11	7	10	134
Total . .	22	22	20	40	25	32	29	23	34	32	18	32	329

Büttner went a step further and made a series of calculations as to the monthly precipitation and temperature, and in a series

of tables found that out of a total of 96 months 40 had a temperature above the mean. In these months 127 cases of eclampsia occurred, that is on an average 3·71 cases of eclampsia per month. In 55 months, with a temperature below the mean, there were 202 cases of eclampsia, equal to 3·607 cases of eclampsia per month. In 54 months, with a precipitation below the mean, there were 181 cases of eclampsia, which is equal to 3·335 per month. In 41 months, with a precipitation above the mean, there were 145 cases of eclampsia, equal to 3·37 per month. In both aspects there were 25 unfavourable months.

It will be apparent, therefore, from a comparison of the tables I have collated, that there is a very marked diversity of opinion. Some find that the preponderance is in the summer, some in spring, some in early winter.

Now we come to the Edinburgh Maternity Hospital, and I must again refer to Table I., which shows the frequency of its occurrence extending over a period of 22 years. This, as far as I know, is the longest period which as yet has been examined. Of course our Maternity Hospital, compared with the German hospitals, is quite a small institution. The number of births during the period of investigation was 8445, and the number of eclampsias 238.

In order to arrive at an approximate estimate of the frequency of eclampsia in the various months of the year, I have compiled the following tables:—

Table I. shows the months of its maximum incidence and the months of its minimum incidence.

Table II., the monthly incidence.

Table III., its incidence in the various seasons of the year, and lastly a chart showing its monthly incidence.

I.

MONTHS IN WHICH THE INCIDENCE IS GREATEST.	MONTHS IN WHICH THE INCIDENCE IS LOWEST.
October 26	July 12
January 25	June 15
May 23	April } 18
August 22	March }
September } 21	November 19
February }	
December }	

II.

EDINBURGH MATERNITY HOSPITAL.

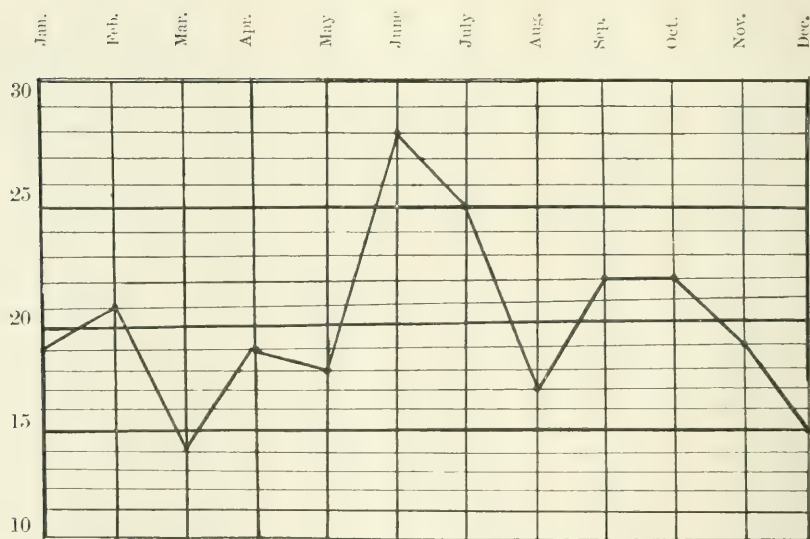
<i>Monthly Incidence.</i>					<i>Monthly Incidence.</i>				
January	.	.	.	25	July	.	.	.	12
February	.	.	.	21	August	.	.	.	22
March	.	.	.	18	September	.	.	.	21
April	.	.	.	18	October	.	.	.	26
May	.	.	.	23	November	.	.	.	19
June	.	.	.	15	December	.	.	.	21

III.

EDINBURGH MATERNITY HOSPITAL.

Seasonal Incidence.

Spring	57
Summer	.	.	.	.	.	.	.	50
Autumn	.	.	.	.	.	.	.	69
Winter	.	.	.	.	.	.	.	65



From these tables it is obvious that the results obtained from carefully examining the incidence of cases in the Edinburgh hospital are quite different from those obtained elsewhere. For example, the highest maximum is the month of October, which is different from any other of the records. I would like to draw attention to the fact that there is nothing in the tables to show a very strikingly pronounced difference, either in the actual months, or, still less, in the seasons.

It seems to me, therefore, from a review of these tables from various sources, that there is not any real seasonal incidence of eclampsia, that it does not occur specially in one season more than another, or in any one month more particularly than another, and that therefore the cause of its varying incidence must be looked for, not in the actual seasons, but in the changes of temperature occurring in the various months.

Take, for example, the striking fact shown on the table by Schatz in Mecklenburg. There eclampsia is most prevalent in the summer months. That is easily enough explained, because in that particular district, which is altogether rural, the women are not exposed in winter, whereas in summer, during the harvest of potatoes and other crops, they are exposed to various heats and colds.

April in New York is a month which is liable to very great changes in temperature. November in Edinburgh is a month which is particularly liable to changes in temperature, and the summer months are the most common for the disease to occur in rural districts, for the reason I have just mentioned.

Take, again, the city of Edinburgh: the greatest number of cases occurred in October; but, as the table shows, the difference between January and October is very slight, the one being 26 and the other 25. Again, the months of May and August only differ by one, so that between the extremes of 26 in October and 12 in July, which is distinctly the lowest incidence, the preponderance of eclampsia in any one month more than another is not so very striking, and its diminished frequency, except in the one month of July, is likewise not very pronounced.

Turning to the table of the seasons and grouping the months in this way, autumn comes out as the greatest in frequency of eclampsia and summer as the least. But the difference between one season and another is not so great as to be marked. It seems to me, therefore, by the statistics of the Edinburgh Hospital and those other hospitals to which I have referred, that as an etiological factor in the production of eclampsia seasonal incidence is not to be considered.

Now, one must have a working basis upon which to theorise, and it seems, at the first glance, a difficult thing to settle why out of, let us say, ten pregnant women under apparently exactly similar circumstances, one should be attacked with eclampsia and the other nine go free. All post-mortem findings go to show that the organs mainly involved in eclampsia are the liver and the

kidneys. It seems to me that the only possible explanation why only one woman should be attacked is that the nine have apparently healthy and properly functioning livers and kidneys which are able to cope with the additional work thrown upon them as the result of pregnancy, while in the tenth these organs are at fault and functioning badly. It is argued that the morbid changes are recent and do not indicate previously existing disease, and that it is due to the action of an unknown toxin, apart from original disease. It matters not: the liver and kidney action is impaired. When the strain of pregnancy is put upon the woman, and when she has to deal not only with the metabolism of herself but also of the child, these organs fail to perform their normal functions, and hence some particular toxin is developed. Should the patient so suffering be exposed to a chill or cold, no matter what time of the year it may happen to be, the fulminating toxæmia is the result.

In looking at this question of the so-called seasonal occurrence of eclampsia it is necessary to have regard, not only to the actual months or seasons in which the greater number of cases prevail, but see under what atmospheric or climatic circumstances eclamptic cases occur in small epidemics or groups. Nagel has added very materially to our knowledge of the subject, and his paper and that of Zangemeister's form the best appreciation of it. Nagel found on looking over the records of the Berlin Hospital that some periods of the year had practically no cases of eclampsia, whereas in other months they occurred in series. On studying the reports of the Royal Meteorological Institute at Potsdam he found that the months which were free or almost free from eclampsia were those months of high barometer, even temperature (warm or cold), and slight precipitation. A change in the weather, bringing with it damp, wet and raw weather, and abundant precipitation, makes existing nephritis worse, and, as a necessary consequence, swells the number of eclamptic cases.

He gives the following curious illustration:—

In the midsummer months July has in some years, for example 1892, 1893, 1898, yielded the greatest monthly number of eclamptic cases. These months were cold and rainy, and, furthermore, they were holiday months.

It seems to me that the outcome of the whole matter is this, that toxæmia, like all other chronic and subacute renal affections, is affected by sudden changes of temperature, so that a latent or quiescent condition may be suddenly awakened to an acute one,

and the fulminating manifestations developed. Climate, weather, and temperature cannot be classified as a cause of the toxæmia, but simply as a condition which precipitates the convulsive attack.

It is not unusual in a hospital such as the Edinburgh one for a number of cases to be admitted from various parts of the town within a few hours of one another, and then to have an absence of cases altogether for a week or ten days. Although during the 22 years over which this investigation spreads it is remarkable that there was no month absolutely free, yet the occurrence of the cases in groups is a very striking fact. I have already said that previous to 1890 there was a period of some months during which there had been no occurrence of that disease, but since that time there has never been any month quite free. In the year 1909, 27 cases occurred altogether, and six of these occurred in the first ten days of August. Take, again, the year 1910; 29 cases occurred, and five of these occurred in six days in the month of September. Seventeen cases occurred in 1906, and three of these in four days in the month of February. Twelve cases occurred in 1902, and four in fifteen days. Twelve cases occurred in 1899, and seven within four weeks. Corresponding to each of the groups there was a sudden fall in the temperature, accompanied with exceptional rainfall. I am not disposed to think, as Fehling suggests, that such a condition is due to mere accident, because I think the condition of the weather is the explanation of those cases occurring in groups.

The grouping would seem, to some extent, to explain the extraordinary conclusion of Stroganof that eclampsia is contagious.

In this paper I have endeavoured to show from the statistics of our own hospital that eclampsia is increasing, and from the same source I have endeavoured to prove that the mortality is decreasing, and the reason why it is so. The tables of this hospital and other sources from which I have derived my information show an enormous diversity of opinion, but judging from our own hospital, which is the longest period over which observations have extended, it may be argued fairly conclusively that as an etiological factor seasonal change is scarcely worth consideration, and that the difference is really due, not to the change from summer to winter, but to a sudden alteration in the temperature and rainfall, irrespective of any particular season.

The points I have failed to explain are, why the frequency

rose in 1899 and has never fallen either actually or relatively since, and also why the disease is milder in twin pregnancies.

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OBSERVATIONS ON THE SITUATION OF THE LESIONS IN OSSEOUS TUBERCLE.*

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MANY observers have noted the relative frequency with which individual bones are infected with tubercle, and numerous tables essentially in agreement with one another have been compiled.

Lexer,¹ in 1904, investigated the blood-supply of the bones, and he instituted the term "metaphysis" to mean that area of bone which exists upon the diaphyseal side of the epiphyseal cartilage. In the metaphysis he demonstrated an intricate and profuse blood-supply, dependent upon the inosculation at that point of two, and possibly three, sets of blood-vessels—the nutrient or diaphyseal, the metaphyseal, and the epiphyseal vessels. Lexer is a believer in the primary embolic infection of tubercle; he argues that the infected embolus entering a bone, lodges in that area in which the anastomosis is most perfect, and that therefore the primary lesion is essentially a metaphysitis. For the short long bones and the short bones there are further explanations—in such, the nutrient arteries enter the bone about the centre and almost immediately break up into a leash of small vessels which disseminate themselves throughout the interior. The abrupt division of the vessels

* From the Laboratories of the Royal College of Physicians, Edinburgh. Full details of pathology are published in the *Journal of Pathology and Bacteriology*, vol. xvii.

necessitates an early arrest of the tuberculous debris, and the resulting disease is a central tuberculous osteomyelitis.

Recently in examining the records, clinical and pathological, of a large number of cases of bone and joint tubercle, I was impressed by the fact that not only are certain bones and joints more susceptible to tubercle than others, but that there are definite localised areas of the bone in which the disease most commonly occurs, and that these areas are such as cannot always be explained by a primary direct infection of the metaphysis.

I would divide osseous tubercle—for it is of that I would more especially speak—into two groups—

- (1) That which occurs in the portion of the bone that lies in relation to a joint; and
- (2) That which occurs in the portion of the bone not in any relation to a joint.

GROUP I.—In the great majority of cases the portion of a bone which lies in relation to a joint is composed of an epiphysis, an epiphyseal cartilage, and the epiphyseal end of the diaphysis or metaphysis, and there has been much argument as to whether, when tubercle attacks such a locus, the disease occurs in the epiphysis or the metaphysis.

In carrying out the investigations I have mentioned, the situation of the osseous disease in each case was noted. I shall describe what I have found to occur in relation to the larger and more commonly affected joints—the hip, knee, ankle, shoulder, elbow, and wrist.

The Hip-Joint.—When tuberculous disease attacks the upper end of the femur, its commonest situation is that portion of the under surface of the neck which lies just at the diaphyseal side of the epiphyseal cartilage (Fig. 3). It begins as a wedge-shaped focus of disease, and from such an origin it extends into the surrounding bone. It is, in fact, a metaphysitis.

Why should the disease originate in such a definite (and defined) location? Exactly opposite the area so liable to infection the synovial membrane is reflected from the capsular ligament on to the under surface of the neck of the bone, and there are reduplications of the ligament which pass on to this region, invaginating the synovial membrane and producing bands of tissue which are spoken of as “retinacula” or cervical ligaments. There are unusual conditions of the vascular supply of this region. I have found that injecting the aorta with lamp-black and tying the femoral artery at the centre of the thigh produces

a mass of injection in that wedge-shaped area in which the disease occurs.

The vessels which pass into this area originate in the *Circus vasculosus* at the reflection of the synovial membrane, and they pass along the cervical ligaments into the interior of the bone. It is by these anatomical relations that the location of the disease is explained; the infection is from the *Circus vasculosus* along the retinacula and into that portion of the bone where the entering vessels most freely anastomose.

In a certain proportion of cases the disease develops in the acetabulum, and more especially at the central pad of fat which marks the attachment of the ligamentum teres, for at this point the vessels running in the ligament pierce and enter the bone.

The Knee-Joint.—In the proximity of the knee-joint the lower end of the femur is the situation in which tuberculous disease most commonly begins.

The upper end of the tibia and the patella are rare and unusual sites. In the femur the metaphysis is not the situation of choice, it is rather the epiphysis (68 per cent.) (Fig. 4). The explanation of the location is dependent upon the arrangement of the overlying synovial membrane, more especially the reflection of the membrane and the *Circus vasculosus*. The vessels which pass from the synovial membrane into the bone lie almost entirely upon the posterior surface. A few pierce the lateral parts, none enter in front.

The upper reflection of the synovial membrane posteriorly does not extend above the epiphyseal cartilage; it is entirely in relation to the epiphysis.

With these facts before one it is easy to understand why tuberculous lesions at the lower end of the femur are epiphyseal and so rarely metaphyseal. If the anatomical reflection of the synovial membrane extends to the metaphysis the bone lesion will be a metaphyseal one.

The Ankle-Joint.—I have already made mention of results obtained by injection of lamp-black into the arteries of a limb. If the popliteal artery is injected with this substance and the bones afterwards cut and examined, there is always found to be a considerable quantity of the injection in the interior of the neck of the astragalus; it is usually sufficient to produce a distinct blackened area in this portion of the bone (Fig. 7). The vessels which form the anastomosis extend inwards from the synovial reflection at the attachment of the anterior ligament to

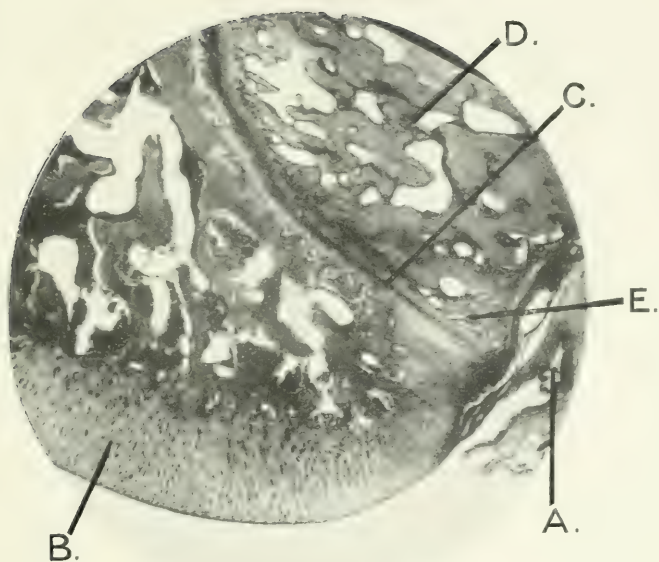


FIG. 1.—THE RELATION OF THE SYNOVIAL REFLECTION TO THE EPIPHYSIS AND THE METAPHYSIS.

The synovial reflection (A.) has extended beyond the epiphyseal cartilage and is lying in relation to the metaphysis.

A. Synovial reflection surrounded by the *Circulus vasculosus*.

B. Epiphysis.

C. Epiphyseal cartilage.

D. Metaphysis.

E. Vessels entering the bone from the *Circulus vasculosus*. (x = 25 diam.)

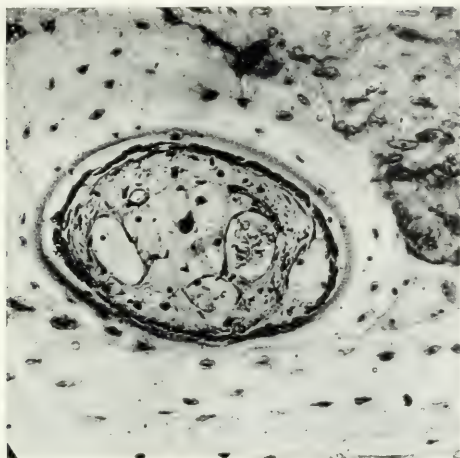


FIG. 2.—VESSELS ENTERING THE BONE FROM THE CIRCUS VASCULOSUS.

The central artery and vein are surrounded by several large lymphatics. ($\times 200$ diam.)



FIG. 3.—X-RAY PHOTOGRAPH OF RIGHT HIP-JOINT (5 YEARS).

Upon the under surface of the neck of the femur there is a wedge-shaped focus of disease extending inwards from the periphery. Its situation is in relation to the position of vessels entering the metaphysis from the *Circus vasculosus*.



FIG. 4.—X-RAY PHOTOGRAPH OF THE RIGHT KNEE-JOINT (3 YEARS).

The lower epiphysis is infected by a focus of disease extending inwards from the postero-lateral reflection of the synovial membrane.

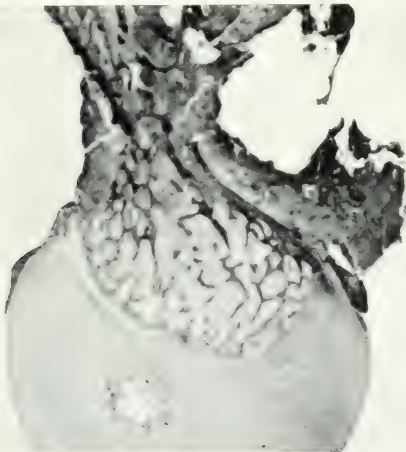


FIG. 5.—VERTICAL SECTION OF THE LOWER END OF THE SHAFT OF THE HUMERUS.

Ossification is just commencing in the lower epiphysis. The metaphysis is healthy.

Disease has begun in the diaphysis at a level which corresponds to the reflection of the synovial membrane. (2.5 diam.)

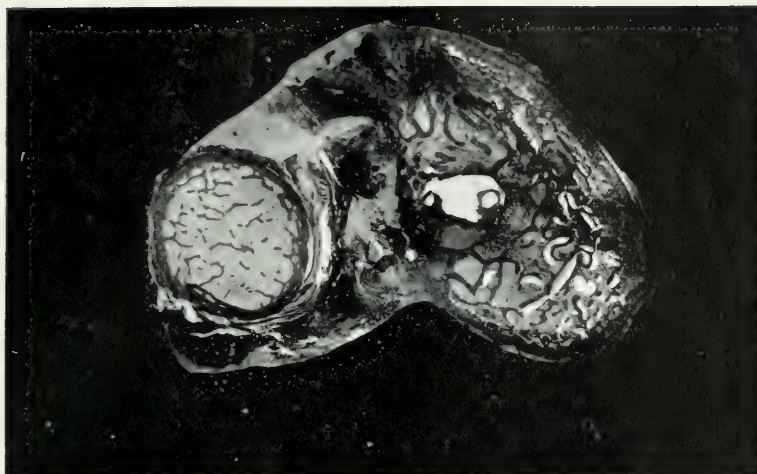


FIG. 6.—THE RADIO-ULNAR ARTICULATION IN TRANSVERSE SECTION AT THE LEVEL OF THE LESSER SIGMOID CAVITY.

Disease is extending into the ulna along the lines of entry of the blood-vessels. ($\times 5$ diam.)

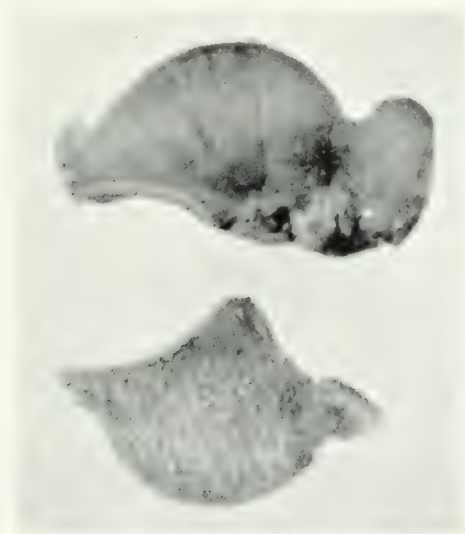


FIG. 7.—VERTICAL SECTION OF ASTRAGALUS.

The popliteal artery was injected with a solution of lamp-black. It will be noticed that in relation to the neck of the astragalus, in the substance of the bone, there is a considerable amount of the injection. The remainder of the bone is almost free.



FIG. 8.—TUBERCULOUS DACTYLITIS AFFECTING THE PROXIMAL PHALANX OF THE INDEX FINGER.

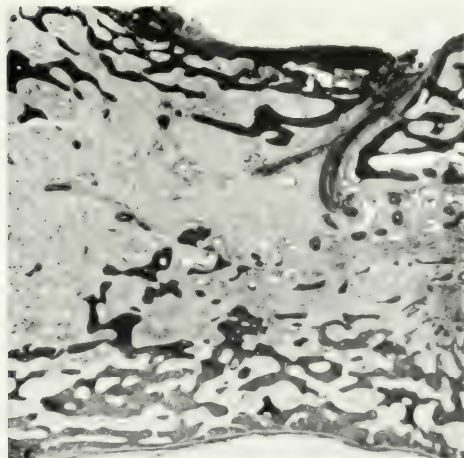


FIG. 9.—METATARSAL BONE IN SECTION.

The nutrient vessel entering the bone is in a condition of endarteritis obliterans (tuberculous). The zone of marrow supplied by it has undergone a fibro-myxomatous degeneration and the lamellae of the area have been absorbed.

The area supplied by the periosteal vessels is healthy. ($\times 7$ diam.)

the neck of the bone. And as one finds anatomically, so one finds clinically, if osseous tubercle occurs in the neighbourhood of the ankle-joint, in 90 per cent. it appears in the neck of the astragalus.

The Shoulder-Joint.—There is little vascular connection between the blood-vessels which anastomose in the capsular ligament and those in the interior of the neighbouring bones. Thus it is that clinically the primary source of tuberculous disease is a synovial one, and any infection of the bone which may result is secondary. If extension to the bones does occur, it is more commonly to the head of the humerus, and as in the femur, the under surface of the neck of the bone, because it is in this situation that the few existing communicating vessels pass from the exterior into the bone.

The Elbow-Joint.—The elbow-joint is an instructive region in which to trace the development of the osseous lesion. The reflection of the synovial membrane upon the lower end of the humerus extends well upwards beyond the epiphyseal cartilage on to the end of the diaphysis. It does so in front and behind, but it is from the posterior reflection that the communicating blood-vessels pass into the interior of the bone, and the bone focus which develops is a metaphysitis infected along the blood-vessels from the *Circus vasculosus* of the joint (Fig. 5). An epiphysitis does not occur unless secondary to advanced disease of the joint, because there are no definite vascular connections with its interior.

In regard to the bones of the forearm, osseous lesions are uncommon. In two situations there are communications between the vessels of the synovial reflections and those in the interior of the bones—the lesser sigmoid cavity of the ulna and the neck of the radius. In these situations bone foci are occasionally found (Fig. 6).

The Wrist-Joint.—As in the shoulder-joint, the wrist is devoid of any considerable vascular connection between the synovial membrane and the underlying bones. A small leash passes into the lower end of the radius at the outer and dorsal surfaces just upon the diaphyseal side of the epiphyseal cartilage. I have seen no communication between the synovial membrane and the ulna or the first row of carpal bones. Clinically, the common lesion is a synovial one—if a bone focus appears its locus is found in the lower end of the radius.

In each individual joint in which tubercle most commonly

occurs I have traced the bone lesions which usually arise, and in each instance I have coupled the pathological findings with the anatomical relations which bear upon the deposit. The primary infection is carried by the arteries of the limbs to the *Circus vasculosus* at the reflection of the synovial membrane, and there the actual and original infection develops. From this point it may extend to the joint and a general synovial tubercle result, or it may infect the neighbouring bone. The situation in the bone which becomes infected is governed by two factors—(1) the portion of bone which lies in relation to the synovial reflection, epiphysis or metaphysis; (2) the presence of vessels passing from the synovial reflection into the interior of the bone (Figs. 1 and 2).

GROUP II.—In this group I include those bones which do not lie in relation to a joint—the diaphyses of the long bones, the short long bones, and the short bones. The infection is a blood-borne one, and it is in its origin an osteomyelitis (Fig. 8). Special bones are picked out for a very definite reason; in certain of them the nutrient vessel which supplies the interior becomes infected with a chronic tuberculous endarteritis (Fig. 9). There is thickening of the lumen and gradual obliteration, and secondarily to the obstruction the interior of the bone becomes degenerated, the red marrow disappears and becomes replaced by a fibro-myxomatous structure. In addition to the myxomatous degeneration in the marrow, the bone lamellæ tend to become rarefied and absorbed. I have seen the condition occur in various situations—in the metatarsals and metacarpals, in the short bones, and in the centre of the diaphyses of the long bones—and it seems to me that when a bone becomes in this way so to speak predisposed, an actual infection with tubercle almost invariably results. The resistance of the marrow is destroyed, and the lumen of the vessels is so narrowed and changed that arrest of tuberculous material is more likely to occur.

Certain bones are more readily attacked than others, and this condition bears some resemblance to arteriosclerosis in so far as it usually affects the vessel at the point where a bifurcation has occurred.

The bones which are most commonly affected are those on the blood-vessels of which the greatest strain is thrown—the dorsal vertebrae, being the most movable in the whole spine, the short bones of the hand and foot.

Conclusions.—I have stated briefly what in my opinion

influences the situation occurrence of bone tubercle. I am aware that the observations are not in keeping with those which are commonly taught and believed, but I make no excuse for their heterodoxy. In support of the views above stated, over 150 different specimens of bone tubercle have been examined, and in every instance one has been able to trace one or other of the modes of infection which I have outlined.

I have to acknowledge my indebtedness to Mr. Stiles, and to Dr. James Ritchie of the Royal College of Physicians' Laboratory. Financial assistance for the research has been obtained from the Trustees of the McCunn Scholarships and the Carnegie Trust.

¹ *Untersuchungen über Knochenarterien*, 1904, Lexer, Tuliga and Turk.

TRANSPLANTATION OF THE OVARY IN THE HUMAN BEING: RECORD OF THREE CASES.

By HUGH S. DAVIDSON, F.R.C.S.

AFTER reading the papers by Marshall and Jolly, and Carmichael, on ovarian grafting in animals, it seemed so certain that homoplastic transplantation of the ovary should be successful, that I determined to attempt it in any suitable case in the human being that presented itself.

The great difficulty was to find what could be called a suitable case, as the experimental work was conducted with, what we may consider, normal ovaries. If one was to be limited to such cases, transplantation of the ovaries would be very rarely performed, as no surgeon in these days of conservative surgery ever removes the normal ovary, or any ovary unless obviously, by appearance or well-defined symptoms, pathological. Even then many, if not most, operators try to conserve some part of the diseased ovary, and thus no necessity for grafting arises. The only likely cases where transplantation of a normal gland would be performed would be cases of double inflammatory tubal conditions, where the ovaries could not be properly isolated until after removal—and how rarely are such ovaries normal. If transplantation, therefore, was to be anything more than a matter of laboratory interest, it was obvious that more or less pathological ovaries must be used, and if the result were successful, a wide sphere of usefulness was then open to the operation. When one considers the unpleasant

symptoms of nervous breakdown, headaches, flushings, etc., which are so often associated with the ordinary menopause, and how these complaints are usually intensified in a premature "change of life" artificially induced in a woman too often already weakened and made nervous by the existing ovarian disease, one is induced to obviate them by all the means at one's disposal, or at least alleviate them as much as possible. Also, if successful, it would make unnecessary to a great extent the so-called conservative surgery of the ovaries, which is of such doubtful value owing to the great—almost insuperable—difficulty in telling, by the naked eye, what part of a diseased ovary is normal. Frequently these cases require a second operation, and this would be prevented if transplantation proved successful.

I have therefore performed the operation on the following three cases. The technique was the same in all three. The organs after removal were immersed in normal saline at blood heat, and, after the peritoneum had been closed, an opening was made in the rectus muscle and two vertical or horizontal slices, of about a quarter of an inch thick, were taken from the ovary in its entire depth. These were fixed into the bed in the rectus, which was sewn up over them with fine catgut. The abdominal wound was then closed.

I used the rectus for two reasons:—*Firstly*, if anything should go wrong with the graft it could easily be got at without again opening the abdominal cavity; *secondly*, if the graft took, there would be greater ease in telling if any swelling of it took place at the time of the period, and if it became painful it could be removed at a later date.

The following are the histories of the three cases:—

CASE I.—Mrs. W., *act.* 26, admitted 29th September 1909, complains of pain two days before, and the first day of, her menstrual period. She has suffered from it for the last three and a half years, and recently it has been so severe that she has had to go to bed for three days each month. Three months ago she was curetted, douched, and plugged, with no result. She is a thin, nervous, pallid person, and seems rather neurotic. On vaginal examination the uterus is anteflexed and rather enlarged, the ovaries are small and hard, but freely movable. A diagnosis of interstitial ovaritis was made. On 1st October the abdomen was opened and supravaginal hysterectomy was performed, with the removal of the ovaries in the usual way. After the peritoneum had been closed, two slices were taken from what appeared to be the less abnormal ovary and were transplanted into the rectus

muscle of the left side. She had a temperature which varied, reaching as high as 102° F., until the tenth day, when the stitches were removed and the temperature fell to normal. It rose again, however, as high as 100° F., and varied between that and normal during the rest of her stay in hospital. The wound showed no signs of inflammatory mischief, nor was it tender at any time. Before leaving hospital she complained of some flushing. I saw her on the 12th February of this year (1912), and she told me that though feeling better now she has suffered off and on from flushings, giddiness, and occasional headaches ever since her operation. She has put on no weight. She also complains of a considerable amount of leucorrhœa. The pelvis is quite clear. The abdominal wound shows no tenderness, and no trace of the ovaries can be felt.

CASE II.—Mrs. M., æt. 29, admitted 3rd January 1911. Three years ago she was admitted with inflammation and was curetted. A year ago she began to have pain and a feeling of something coming down, just before and at her periods, which were sometimes bad enough to make her lie up. This has gradually increased, but has always disappeared between the periods until the last month, when it has been continuous. The patient, who has had five children and three miscarriages, is a pale, thin, worn-looking woman. Menstruation regular, but for the past six months has felt done up after her period, which has lasted for six days. The pouch of Douglas is filled up with a mass behind the uterus, which lies forward. No tenderness on pressure. A diagnosis of inflamed appendages was made. On 5th January the operation was performed. A mesial incision was made below the umbilicus. Both ovaries were found prolapsed into the pouch of Douglas, and were adherent to each other and to the back of the uterus. The right one was cystic and surrounded by adhesions, and the left one was rather more advanced in a similar condition. Both tubes were kinked and contained fluid. Double salpingo-oöphorectomy was performed, the stumps ligatured, and the raw surface covered by peritoneum. The abdominal peritoneum was then stitched up. The right ovary had meantime been kept in saline at blood heat, and two slices from it were now implanted in each rectus. The wound was then closed in layers and the patient put back to bed. The temperature varied from 100° F. to normal for the first five days, and after that remained normal. The patient was discharged at the end of three weeks. In the middle of May 1911 she had pain in the left side of the wound, which felt stiff. This lasted for a

day, but was not severe. The following month bleeding from the uterus occurred and lasted for a fortnight, without any pain. A month later the bleeding recurred and lasted for a fortnight, again without any pain either before or during the period. On 1st August the bleeding returned and lasted nearly three weeks without pain. I saw her then, and on examination there was no tenderness on either side of the abdominal scar, but distinct hardish lumps could be felt in each rectus. *Per vaginam*, a rounded tumour the size of a hen's egg could be felt in the pouch of Douglas, attached to and moving with the uterus. Presumably this was a fibroid. Abdominal operation was advised to remove the uterus plus the tumour. At the same time one could have obtained one of the ovarian grafts for microscopic examination, but as the patient was suffering no pain she refused to have anything done. I saw her on 12th February of this year, and she told me that she had menstruated for a fortnight in September and again in October. In November the period lasted only four days. On no occasion was there any pain. Since November there has been a good deal of leucorrhœa, but no recurrence of the periods. She could recognise when her period was coming on by a feeling of heaviness in the pelvis as before operation, and a stiffness in the wound, but there was never any pain. No swelling was noticed in the wound. She has had no symptoms of the menopause, and she is getting much stouter and heavier. One can feel two distinct lumps in her left rectus.

CASE III.—Annie F., æt. 27, admitted 26th June 1911, complains of pain in the lower part of the abdomen, which is worse at the time of the period. She sleeps badly, and complains continuously of pain, which she says at times is very severe. Occasionally she seems to forget about it and talks most animatedly. She began to be unwell at the age of 14, and had no pain till she was 21. At this time she began to suffer from pain coming on before her period and disappearing after the first day. The periods last from four to five days and the loss is not excessive. She got gradually worse as time went on, till now the pain is unbearable. On vaginal examination the uterus is in front, normal in size, freely movable, and not tender. The ovaries are not evidently enlarged, but are very tender on pressure. They are prolapsed into the pouch of Douglas, and fixed. Abdominal operation was advised, and took place on the 29th. The ovaries were found attached by a number of adhesions to the back of the uterus. They were separated, and both tubes and ovaries were removed.

The latter were about normal in size, the surface being studded with enlarged follicles. They were placed in saline at blood heat. After the peritoneum had been sewn over the raw stumps, the parietal peritoneum was sewn together with catgut. An incision was made into each rectus, and slices from each ovary were implanted in the bed thus formed, and fixed in position with fine catgut. There was a good deal of bleeding from the muscle wounds. The rest of the wound was then closed in the usual way.

The temperature hovered between 100° F. and normal until the stitches were taken out on the eleventh day; after that it remained normal. The wound showed considerable extravasation of blood, but was never tender to the touch.

In October—that is to say three and a half months after her operation—she menstruated for a fortnight, with considerable upset of her general condition. She was admitted to the Deaconess Hospital in a rather hysterical state, but nothing abnormal was discovered. Two lumps could be felt in each rectus, and she stated that the wound had felt stiff for a day or two. The pelvis was quite clear. In November she had a period without any pain or discomfort, and under ergot it lasted only four days. Since then she has menstruated every month for nine days. There is some swelling and stiffness at the sides of the wound before and after these periods. Her general health has much improved.

The latest compilation of the literature on the subject by Martin of Chicago shows that a great deal of work has been done on the subject, but most of it has been in animals, though numerous such operations have also been performed in the human being. As early as 1902 there is Brennan's case, which was performed for menstrual epilepsy, and the ovary was transplanted into the fundus of the uterus. It was successful. Quenu and Sauvé report a successful case, but the transplanted portion had to be removed nine months later owing to pain, and histologically very little ovarian tissue was to be found. However, a distinct menopause set in thereafter, so the transplanted portion must have been, to a certain extent, alive and functioning. Casalis reports a case where he transplanted a piece of ovary the size of a small walnut to a raw surface on the uterus close to the uterine artery. It seemed to him to be normal, though the rest of the ovary was cystic. Menstruation returned two and a half months later, and persisted for four years. She then began to have severe seizures of collapse

and vomiting just before the period was due. They were relieved by the appearance of menstruation. He could make out by vaginal examination that the transplanted part was about the size of an almond, and felt very hard. He regards the attacks as being menopausal in origin, and thinks the ovary is being replaced by fibrous tissue. Tuffier and Chapman report a case of homoplastic transplantation where menstruation returned four and a half months after the operation, accompanied by pain and swelling over the abdominal wound where the ovary had been implanted. The ovary was quite palpable under the skin. A most successful case is reported by Kayser of a patient on whom he operated for a right-sided ovarian tumour. Five years later he operated again to remove a tumour on the left side, which was a tubo-ovarian cyst. At one part of the tumour there was some unaltered ovarian tissue. He took two slices of this and implanted them into the vastus externus. Three weeks later she had a four-day period, and two years later was still menstruating pretty regularly with the exception of two occasions, once where there was a forty-seven day interval, and a second where there was no period for four months.

The most striking case of hetero-transplantation being successful is the case related by Sir Halliday Croom to this Society five years ago. Not only did the patient menstruate, but she succeeded in actually developing a full-time child of her own from an alien ovary. Apart from this I have been unable to discover in the literature any case at all comparably successful, though a certain amount of success has been reported in one or two cases. Martin reports two cases of hetero-transplantation of the ovary into the broad ligament where the patient had been previously sterilised. In one case, after three months, she felt the symptoms of an impending period, but only a white discharge appeared. Eleven months after the operation she menstruated, and during the intervening months she felt at regular monthly intervals the symptoms of a period, but there was no discharge of blood. The subsequent history is not given. In the second case a somewhat similar history is given, and there was a little blood-staining in the mucous discharge five months after the operation, but there was severe pain with it.

Morris, in a discussion before the American Association of Obstetricians and Gynecologists, mentioned a case of hetero-transplantation to bring back menstruation after an artificial menopause. He succeeded in causing it to return for several

months, but not permanently. In another case he treated a woman with infantile uterus in this way, and she menstruated for a year after but then ceased. In all these cases more or less success has been obtained in the human subject where homoplastic transplantation was performed, but the transference of graft to another person is a more difficult thing to manage with any idea of permanent growth and functioning of the transplanted organ, though temporarily it takes. This would seem to be due to the antagonistic quality of the blood to the transplanted organ of another person. Marshall and Jolly found this to hold good in animals also, but those cases which were successful seemed to have been where the animals selected were of the same litter.

The most interesting thing to me in my cases which I have related above is the fact that in none of them has there been any return of pain, periodic or otherwise, in the slightest degree. The grafted portion evidently takes on fresh vascular and lymphatic connections, but in all probability no fresh communication with the central nervous system. This fact allows to us a much greater freedom in operating for painful ovaries; this may or may not be an advantage. Until recently they were removed probably too freely, but now the whole tendency is to conserve them as much as possible, and even avoid operation entirely, though the condition is debilitating the patient more than an artificial menopause would. With the certainty that a grafted portion will grow and give rise to no more pain, and at the same time ensure the patient's freedom from menopausal symptoms, the surgeon of to-day enjoys a latitude hitherto unknown. I am sure that every gynecologist must have seen cases that have been delayed too long under the fear of the menopause that follows oöphorectomy, and what hope have we of making any success of the operation in a person whose nervous system is completely unstrung, even by removal of the original exciting cause. Many have been completely cured in the past, and with the aid of grafting more should be restored to health in the future.

In regard to Case I., it is fairly obvious that the graft was unsuccessful, as she had distinct symptoms of the menopause after the operation; as the uterus was removed owing to the fibroid condition, we have no subsequent menstrual history to help us. In her case the grafting has been of no advantage, as the transplanted portion has evidently died and been absorbed. It is possible that the temperature she had after operation may have been due to

the aseptic absorption of the ovarian graft. Certainly it in no way interfered with her convalescence.

Case II. is interesting in connection with the appearance of the fibroid tumour after the operation. It was certainly not palpable at that time, as I took particular care to examine the uterus in case some such condition should be present. Am I to hold myself responsible for its appearance? I suppose I must, as without the presence of ovarian tissue somewhere it is hardly probable that a fibroid would develop *de novo* in the atrophied uterus that always follows double oöphorectomy. I am doubly regretful that she refused to have a second operation, as one could have cured the uterine condition and at the same time have obtained microscopic proof whether the transplanted ovary had taken or not. I doubt if I will allow the chance of such an accident to occur in the future unless the patient is extremely desirous of still having the possibility of bearing children. In that case I should leave the uterus and perform intra-peritoneal transplantation. In all other cases I consider that the uterus is just as well removed, as it is of no value to the patient with the ovarian tissue extra-peritoneal, and it may be a source of future trouble, as it was in this particular case.

In Case III. the most striking point is the very severe hemorrhage at her first period after operation, without any such obvious pathological cause as there was in Case II. In animals, Marshall and Jolly found that in some cases of castration the uterine mucosa became swollen and the epithelium degenerated. In the human being one occasionally sees fairly severe bleeding following on an oöphorectomy just after the operation. Does the explanation of my patient's excessive hemorrhage lie in this fact? Was the uterine mucosa more or less degenerated when the influence of the graft made itself felt by the returning congestion of the uterus, with the result that she had excessive bleeding? One cannot say for certain, but I suggest it as a possible explanation.

Finally, there is one point more of possible practical importance. Bond, in a series of experiments, discovered that after the removal of one ovary the other does not hypertrophy without certain stimuli: these are sexual connection or pregnancy, the more marked being the latter. This would suggest that ovarian grafts would have more chance of taking in cases of married women, and it might even be a deciding factor so long as the graft was implanted somewhere in connection with the pelvic

blood-vessels, to receive thereby the benefit of the pelvic congestion which accompanies connection.

Though the results of the three cases I have related are not conclusive proof that ovarian grafting is of great importance, yet when taken with the numerous other cases now recorded in medical literature it is certainly worthy of trial. There will always be the objection made against successful cases that a piece of the ovary has been left *in situ* at the time of the operation, or that there has been an accessory ovary present. One cannot absolutely deny this possibility, but in my own cases I naturally took all possible care to see that these fallacies were guarded against. I am hopeful that other members may take up this line of treatment when removing ovaries for pain, as in none of my patients has there been any recurrence of that severe and distressing symptom. Certainly one can do no harm by grafting a portion of the ovary, and one may do a considerable amount of good by preventing the artificial menopause should the transplantation be successful, as it was in Case III.

NOTE.

Since reading this paper to the Obstetrical Society I have again seen Case III.

She came to me complaining of bleeding too much, and said that since April she was usually unwell for a fortnight or more, though there was now no pelvic discomfort. On examination a lump could be felt in each rectus the size and shape of a half walnut. Firm pressure on either of these caused a sickening sensation, but not much pain. She said they caused her no discomfort.

Under chloroform I curetted her, and found the uterus exactly normal in size, but lined by a markedly thickened mucosa. Some of the scrapings were sent to the laboratory of the Royal College of Physicians, and the report was that the condition was one of villous endometritis.

As it is a year since the abdominal operation, I think it has been established that in her case the ovarian grafts have definitely grown and are functioning.

RECENT LITERATURE.

CRITICAL SUMMARIES AND ABSTRACTS.

MEDICINE.

By JOHN D. COMRIE, M.A., B.Sc., M.D., F.R.C.P.,
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WASSERMANN REACTION.

THE literature concerned with the presence of the Wassermann reaction in diseases other than syphilis has been collected and analysed by Marchildon (*Interstate Med. Journ.*, September 1912). It has generally been assumed that this reaction is quite pathognomonic of syphilis, but since Much and Eichelberg (*Med. Klinik*, No. 18, 1908) showed that it was commonly present in scarlet fever—their results gave 45 positive reactions in 100 cases—other workers have accumulated statistics bearing upon its reliability as a specific test. For example, Bruck and Cohn found the reaction present in 8 out of 28 scarlet fever cases examined at the height of this disease. Most of those who have experimented with regard to scarlet fever have found that either twice as much of the patient's serum as usual was required for a positive reaction, or the reaction was given only with some extracts used as antigen and not with others, or the reaction was a fleeting one, which disappeared when the patient recovered. Similarly in pulmonary tuberculosis Weil and Braun out of 21 cases got 2 positive results, while Boas among 49 extensive cases of this disease found 3 that reacted positively. The writer had obtained two positive results in very advanced cases of pulmonary tuberculosis in which he had no reason to suppose that syphilis was also present. In typhoid fever, frequently in malaria, sometimes in malignant tumours, especially tumours of the nervous system (sarcoma, psammoma, fibroma, etc.), and also in lead-poisoning, after anæsthesia, in leprosy, and in eclampsia, positive results have been recorded. The writer of the article concludes, as the result of his own observations and those of others, that while a positive Wassermann reaction sometimes occurs in the tropical diseases mentioned, it is not the rule even in these conditions; and in a non-tropical climate the unusual occurrence of these does not lessen the practical value of the test. In scarlet fever the reaction disappears so quickly that this disease need not be considered as a fallacy. Thus though the test may be given apart from syphilis, it must, for practical purposes, be considered characteristic of that disease.

HEREDITARY CRANIO-FACIAL DYSOSTOSIS.

A new type of dystrophy in the cranio-facial bones is described by Crouzon (*Presse méd.*, 7th September 1912) under the name of hereditary cranio-facial dysostosis. This record concerned two cases, mother and son, who presented a great frontal boss with transversely running crest, prognathism carrying the lower jaw several centimètres to the front, and a very much hooked nose; they also showed marked external strabismus and enlargement of the thyroid gland. Two collaterals, first cousins of the son, showed a slight crest of the frontal bone. The writer regards his cases as belonging to the group of teratological anomalies which are to be found in certain families, passing through a great number of generations, like the prognathism of Charles V. and his descendants, and often found with such stigmata of degeneration as hare-lip and infantilism. The exophthalmos and divergent strabismus, which were very noticeable in these two cases, he attributes simply to osseous malformation of the orbital walls.

TREATMENT OF EPILEPSY.

Five years' experience in the treatment of epilepsy by the salt deprivation method is detailed by Ulrich (*Münch. med. Wochenschr.*, 3rd September 1912), the director of the institution for epileptics at Zürich. Few physicians, he states, have pursued this form of treatment for more than a few months at a time, and therefore he records the results attained by the administration of bromide in the absence of salt from the diet over a period of five years. The cases are given in full detail, but the features of one may be taken as typical of all. The epileptic attacks had in this case lasted for 30 years, during which the total number of seizures had been about four thousand. During at least sixteen years bromide treatment had been carried out to the extent of one and a half to two drachms of this drug daily. There had been no improvement—indeed the number of attacks was rising, and in 1907, when the patient was on bromide only, there were 207 attacks; while after the salt-free diet was combined with bromide administration the attacks fell to 37 in 1908, 51 in 1909, and none at all in 1910. In another patient aged 31 there had been 3300 attacks in 12 years of bromide treatment. Starting a salt-free diet in 1907 she had only 152 seizures as against 226 in the previous year. Next year they fell to 39, and then for two years she had complete freedom. In several other cases there was either a complete stoppage of the fits or a reduction of their number by about 50 per cent. when the salt-free diet was instituted. Maier (*ibid.*) describes the results obtained both with these cases and with others in a psychiatric clinic by using a soup made from "Sedobrom" tablets. These contain each about 16 grains of bromide of soda, a very

little salt, and sufficient extractive and fat to taste like a strong meat soup when dissolved in 100 c.c. of water. Two of these tablets were given night and morning and were well borne. The rest of the food was made as poor in salt as possible.

ELECTRO-MAGNETIC TREATMENT OF CANCER

Various forms of radiation have been tried of recent years in cancer and rodent ulcer, sometimes with benefit, sometimes with none. Spude (*Münch. med. Wochenschr.*, 30th July 1912) describes a method of combined electro-magnetic application with arsenic which he has found successful in healing up two cases. One case was that of a cancer affecting the inner canthus of the eye. The other cancer was situated in the centre of the forehead. The method consisted in the injection of a suspension of black oxide of iron directly into the tumour near its margin, and the subsequent application of an electro-magnet over its surface. After 60 séances spread over 4 months the eye tumour had become covered with healthy epithelium, but a mass remained until the writer also began intravenous injections of atoxyl at intervals of 4 to 8 days. After 5 weeks of this combined treatment the tumour completely disappeared. In the other case the iron and arsenic were both injected locally, the main mass of the tumour was removed with the sharp spoon, and complete disappearance had taken place in about thirty weeks.

EFFECT OF HIGH VOLTAGE CURRENTS ON THE BRAIN.

The large number of accidents that now constantly take place from the escape of industrial electric currents make the communication by Spitzka and Radasch upon the brain lesions caused by electricity as observed after legal electrocution (*Amer. Journ. Med. Sci.*, September 1912) of great interest. The brain and cord had been removed from the bodies of five criminals executed by electricity, and had been immersed in formalin within 15 minutes after death. The lesion was a very striking one of the same character in all the cases. Sections both of the brain and of the cord showed circular areas, ranging from 25 to 300 μ . in diameter and mostly from 150 to 200 μ . These contained a central rarefied and a peripheral condensed zone, while in most was situated a small blood-vessel surrounded by a delicate small-meshed reticulum representing the central four-fifths of the area with its fibrils in the main directed radially. The peripheral zone stained more deeply than the surrounding tissue and appeared to be condensed. Where a blood-vessel ran longitudinally in the sections it appeared surrounded by a series of these circular areas strung on it like a row of beads. This is very evident in the photo-micrographs that accompany the article. The writers conclude that the head-like

arrangement of the lesions along the blood-vessels, the condensation zone limiting each lesion, and the radially arranged fibres and torn tissue would seem to indicate a sudden liberation of bubbles of gas, due to the electrolytic properties of the current as it seeks the path of least resistance along the vessels. To this escape death appears to be due. The currents used were mostly of about 1800 volts and 9 or 10 amperes.

BLOOD-PRESSURE IN RENAL DISEASE.

The relation of arterial hypertension to urinary excretion is dealt with by Lawrence (*Amer. Journ. Med. Sci.*, September 1912). He first gives a general review of the opinions expressed by observers of note upon the subject. Bright's theory of a poison circulating in the blood and stimulating the heart to increased activity and hypertrophy is opposed to Traube's idea that the increased tension and consequent cardiac hypertrophy are due simply to the mechanical effect of the blockage set up by destruction of vessels in the diseased kidneys. The generally accepted view of Cohnheim is a combination of these, whereby the changed character of the blood is supposed to set up contraction of the renal vessels, so that to maintain the circulation through the kidneys an increase of pressure with consequent hypertrophy becomes necessary. Experimental evidence, however, raises objections to the idea that the increased pressure is of a beneficent purposive nature; thus Senator showed that ligature of the renal artery or extirpation of the kidney does not produce a general rise of pressure, while other observers have found that an artificial increase of the general blood-pressure does not cause an increased blood-flow through these organs nor an increase of the urinary secretion. Clinically, too, it is observed that when the blood-pressure is very high in acute Bright's disease or in uræmia a beneficial effect is produced by administering drugs to lower this. The writer accordingly undertook the observation of 20 patients suffering from cardio-renal disease with a blood-pressure over 180 mm. of mercury so as to determine the effect upon the kidney function of artificially varying the pressure. In all 205 observations were made. Three cases, all of patients in the last stages of cardio-renal disease, showed a lessened urinary output when the blood-pressure was lowered, while on the contrary 12 cases showed an increase in urine and urinary solids when the systolic pressure was lowered by the administration of nitrites. For example, one patient with a systolic pressure of 230 mm. secreted 90 c.c. of urine in one hour, while after lowering of the blood-pressure by sodium nitrite to 190 mm. he secreted 485 c.c. of urine in one hour. The writer, however, came to the general conclusions that (1) no definite relation can be established between changes in the systolic or diastolic pressure *per se* and a change in urinary output; (2) when, however, the pulse

pressure increases in the presence of a falling systolic pressure (*i.e.* when diastolic pressure falls more than systolic pressure) there is a diuresis.

TUBERCLE BACILLI IN BLOOD-STREAM.

Several workers have recently published the results of their investigations upon the presence of tubercle bacilli in the blood. For example Hilgermann and Lossen (*Deutsch. med. Wochenschr.*, No. 19, 1912) examined the blood in 64 cases of pulmonary tuberculosis and found the bacilli present in the blood of 17, *i.e.* about one-quarter of all the cases. These were not by any means cases of the most advanced type, but in some instances were at an early stage of the disease. There was no apparent relationship between rise of temperature and the finding of the bacilli, and their presence is not to be regarded as a sign of the onset of miliary tuberculosis. Nevertheless the disease appears to run a more unfavourable course in those whose blood contains bacilli than in those the examination of whose blood is negative.

SURGERY.

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THE OPERATIVE TREATMENT OF POTT'S DISEASE OF THE SPINE.

FOR many years the generally accepted treatment of Pott's disease has been rest and mechanical support for the diseased vertebral column. That this treatment is attended with much success none can deny, but that it still leaves much to be desired is equally certain. The conservative methods in common use, while they limit motion, do not secure absolute immobilisation of the diseased joints, nor do they entirely relieve pressure on the involved vertebral bodies. Accordingly it is necessary to continue treatment for long periods of time, and in almost every case the deformity increases as the cure becomes complete: this is especially true with disease in the dorsal region. The method of forcibly correcting the deformity introduced by Calot has after an extensive trial been practically abandoned, for it has been abundantly demonstrated that the capacity for bone formation between the separated vertebral bodies is quite inadequate to fill the gap caused by straightening the spine.

During the past few years considerable attention has been directed to operative measures which have been designed for the double purpose of shortening the duration of treatment and preventing deformity.

All the operative methods which have been devised have been based on the fact that each vertebra is a lever, having a long arm, the laminae and spinous process, a short arm, the body, and a fulcrum, the articular

processes. If we immobilise the spinous processes and laminae of adjacent vertebrae not only will the corresponding bodies be given absolute rest but they will be prevented from collapsing.

The first operation for the purpose was suggested by Hadra (*Trans. Amer. Ortho. Assoc.*, vol. iii. 1891). He proposed to bind the spinous processes of the diseased and adjoining healthy vertebrae together with figure-of-eight turns of silver wire. More recently Lange (*Journ. Amer. Ortho. Assoc.*, November 1910) recorded a very successful case where he immobilised the diseased vertebrae by introducing through small incisions at either side of the spines, splints of tin-plated steel wire, which he attached to the spinous processes by silk ligatures.

In 1911 Hibbs (*New York Med. Journ.*, 27th May 1911) described an operation in which the spines and laminae themselves were used to produce a firm ankylosis of the posterior parts of the vertebrae. In Hibbs's operation an incision is made along the spinous processes, and the interspinous ligament is split and separated with the periosteum to either side. With a chisel the base of the spinous process of the sound vertebra above the diseased area is cut through, and this procedure is repeated on the spinous processes of the vertebrae involved by the disease, including finally that of the sound vertebra below. Each spinous process is then displaced and tilted downwards, so that while a part of its base is still in apposition with the surface from which it has been displaced, its tip is brought into contact with the upper part of the area from which the spinous process of the vertebra below has been separated. In addition, the periosteum of the laminae is separated, and a small piece at the lower border of each lamina is chipped off and turned downwards along with the loosened periosteum till it makes contact with the lamina below. The tissues are then sewed over the fragments. A steel brace is applied, and absolute rest in bed is continued for from 8 to 10 weeks. During the next few weeks sitting is permitted, and at the end of the twelfth week walking is allowed, the brace being worn for another month. In Hibbs's first case a radiogram taken 3 months after operation showed consolidation of the four spinous processes. In a later report (*Journ. Amer. Med. Assoc.*, 12th August 1912) the same writer records 47 cases treated by this operation. Twenty of the patients had been going about without support for from 3 to 12 months, and had shown no symptoms of disease nor any increase in deformity. A rapid improvement in general health was observed in most cases, especially in those operated on early in the disease. The cases most suitable for operation are those in which the disease has not progressed so far as to have led to any marked degree of deformity.

Albee (*ibid.*, 9th September 1911) describes an operation which he performs for fixation of the diseased portion of the spine in Pott's disease. He transplants a long bony splint from the shaft of the tibia,

inserting and securing it in a furrow made by cleaving the spinous processes of the affected vertebræ and those of a healthy vertebra above and below them. He maintains that this operation has the advantage over that of Hibbs in that immediate immobilisation is secured, and that as the long arms of the spinal levers—the spinous processes—are not broken across, greater purchase is obtained in preventing the collapse of the vertebral bodies. In a later report (*ibid.*, 10th August 1912) he states that he has performed this operation with success on 47 patients. Whitman (*Ann. of Surg.*, December 1911) records a case in which he applied two bony splints transplanted from the tibia along the sides of the spinous processes of the affected vertebræ in a case of Pott's disease. He considers that operative treatment is specially indicated in early cases of the disease in the thoracic region.

In the discussion on this subject at the annual meeting of the American Medical Association in June 1912, Huntington, speaking from the point of view of the anatomist, remarked on the frequency with which he had found fusion of two or more of the lumbar or lower dorsal vertebræ in skeletons otherwise healthy, and pointed out that the operation of Hibbs invaded a territory in which the natural tendencies were all in favour of a good result. All agreed that the results which have so far been obtained justify an extended trial of these operative measures.

LINITIS PLASTICA (CIRRHOSIS OR FIBROMATOSIS OF THE STOMACH).

Lyle (*Ann. of Surg.*, November 1911) records a case of this disease, and gives, in addition to a very full description of the condition, a critical analysis of all the published cases. "The term linitis plastica was used by Brinton to designate a special disease of the stomach, benign in nature, characterised pathologically by a diffuse or circumscribed increase in the connective tissue, involving chiefly the sub-mucosa, and to a lesser degree the other layers, giving rise to a marked thickening of the stomach walls, with a corresponding diminution in its lumen; clinically, by its insidious onset, its slow progressive gastric symptoms, its cachexia, and fatal termination."

The pathogenesis of this affection is not yet clear. Although the majority of writers maintain that it is a chronic fibrous proliferation, essentially benign, others hold that it is an infiltrating carcinoma. From an analysis of the cases recorded as linitis plastica, Lyle finds that 71 were benign, *i.e.* true linitis plastica, whilst 60 were undoubtedly cases of infiltrating scirrhus cancer, and should not have been classified as this disease. In a large proportion of the cases of true cirrhosis of the stomach the patients suffered from some cardiac lesion and from arteriosclerosis, and the co-existence of these diseases has been so striking as to suggest some inter-relationship. Krompecher holds that

this disease, which he prefers to designate gastro-intestinal sclerosis, is not confined to the stomach, but may also affect the intestines and peritoneum, that it is the result of a chronic venous oedema caused by cardiac insufficiency and arteriosclerosis, and that the pathological process bears a close relation to scleroderma.

In the stomach the disease occurs in two forms, the local and general. The localised form is usually met with as an indurated plaque in the wall of the pyloric portion of the stomach; frequently it encircles and stenoses the pylorus. The infiltration shades insensibly into the normal stomach tissue but stops abruptly at the duodenum. In a typical case of the generalised form we find the stomach as a shrunken thick-walled tube lying transversely across the epigastrium. Often the walls of such a stomach are so rigid that if the viscus be removed it does not collapse but maintains its original shape. The peritoneal coat has a peculiar dull greyish colour which gives to the stomach an appearance as of diffuse scarring. On section the stomach wall is found to be six or eight times thicker than normal. The most marked and constant lesion is seen in the submucosa, the connective elements of which have undergone a diffuse hypertrophy. Interlacing white connective-tissue bundles stand out as irregular bands. The resemblance which this tangled interlacement of fibres bears to the weave of sail-cloth suggested to Brinton the term "linitis." The mucous membrane appears approximately normal; it is quite exceptional to find any trace of ulceration. The subserosa shows a marked connective-tissue infiltration.

Linitis plastica is a disease of adult life, the majority of the recorded cases being over 40 years of age. The diagnosis of the condition is extremely difficult. The onset of the disease is insidious: for months or years there is an indefinite history of dyspepsia, then definite progressive gastric symptoms appear, followed by severe anemia, starvation, cachexia, and death. Vomiting in the early stages of the disease is an instant symptom; in the later stages incessant vomiting is the rule. It is the vomiting of a stomach which is intolerant of the quantity of food rather than the quality. In 13 of the recorded cases a sausage-shaped tumour was felt in the epigastrium. In one case an X-ray examination showed a very small stomach of the infantile type, drawn well up under the ribs.

Unrelieved by surgical measures the disease is uniformly fatal. In 43 cases the average duration of the disease was 4 years. The practical difficulties of making a diagnosis between this condition and scirrhus cancer and the possibility of it being a precancerous state makes gastrectomy the operation of choice. Should the condition of the patient or the presence of extensive adhesions preclude such a radical measure, a gastro-enterostomy may still be possible. In two recorded cases the latter operation has been attended with success. If a gastro-

enterostomy be impracticable, a jejunostomy *en-Y* gives a better clinical result than does gastrostomy.

TRAUMATIC RUPTURE OF THE INTESTINE.

When force is suddenly applied to the abdomen, as for example by a kick from a horse, there is a very considerable risk of a rupture of the intestine, although the abdominal wall may show no sign of injury. Tschistossersdoff (*Beitr. z. klin. Chir.*, Bd. lxxix. H. 1, 1912) has collected 52 cases of this accident from the records of one of the St. Petersburg hospitals, and in a critical analysis of these brings out some interesting points. The condition is met with most frequently in young adult males; it is quite a rare accident in females and children. Weakness and flabbiness of the abdominal muscles and a greater or less degree of distension of the intestine predisposes to rupture when a sudden force is applied to the abdomen. The usual mechanism would appear to be a nipping of the intestine against the vertebral column, but the force may be of a tearing character. A blow applied at right angles to the abdominal wall is much more liable to cause a rupture of the intestine than is one in an oblique direction. In the vast majority of cases the abdominal wall shows very little damage; in only 3 out of 52 cases was there found any hæmorrhage into the subcutaneous or muscular tissues. In 75 per cent. of cases the rupture was in the middle third of the small intestine, in 8 per cent. in the upper third, in 12 per cent. in the lower third, and in only 5 per cent. was the colon involved.

As regards the symptoms in these cases, shock was a prominent feature only in those cases where the force had been applied over a large surface of the abdominal wall; in the majority of cases it was not pronounced. The presence of free gas in the abdomen with loss of liver dulness was seldom found (7 out of 52 cases). "Primary meteorism," *i.e.* tympanitis occurring during the first few hours after the traumatism, usually means, as Lexer first pointed out, that there is no serious injury to internal organs, but merely a bruising of the retroperitoneal nerve plexus, with possibly some hæmorrhage into the retroperitoneal tissues. Marked rigidity of the abdominal muscles and tenderness on pressure over some limited area of the abdomen are the most trustworthy signs of a rupture of the intestine. In all cases of doubt an immediate exploration should be carried out. Of 10 cases operated on within six hours of the injury 5 recovered, whereas of those in which the abdomen was opened twenty-four hours or more after the injury all proved fatal.

DISEASES OF CHILDREN.

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CHVOSTEK'S SIGN AND ITS SIGNIFICANCE.

IN 1876 Chvostek of Vienna described a sign which he believed was characteristic of tetany. This sign, since then called Chvostek's sign, or the facial phenomenon consists in an easily demonstrated mechanical excitability of the peripheral nerves. There has been a considerable diversity of opinion regarding the cause of the twitching, some authorities claiming that it was due to a spinal reflex, while others, chief amongst whom was Escherich (*Die Tetanie der Kinder*, Vienna, 1909), maintained that it was caused by a heightened irritability of the nerve trunk. At first it was supposed that it was only present in individuals suffering from tetany, and it is universally regarded as one of the three cardinal signs of that disease, the other two being Trousseau's and Erb's symptoms. The sign is so easily elicited and so characteristic that it has been tried for in many varied conditions, exclusive of tetany, and numerous observers have found it present in conditions which seem to have no connection with that disease. Not only is the constancy of the sign questioned, but the degree to which the face twitches has been interpreted as being of varied importance. Schlesinger (*Wien. klin. Wochenschr.*, 1910, p. 315) divides the phenomena into three grades, according as the twitching is confined to the scarlet border of the lip, the side of the nose, or the entire side of the face. The most marked facial twitching is by many conceded to be present in tetany alone. It is only in tetany also that the so called Schultz phenomenon is observed, that is, where there is such increased excitability of the nerve that by merely lightly stroking the skin a distinct facial twitching may be obtained. Loos of Vienna (*Wien. klin. Wochenschr.*, 1911, No. 49) came to the conclusion, after examining a large number of cases, that the sign was present not only in tetany but in many other diseases as well, and that it was frequently found positive in hysterical and nervous children. He describes eighty children with positive facial phenomena but without any other signs of tetany. He concludes that—(1) The positive sign is an expression of general disturbance of nutrition. (2) It may be present in many members of the same family when it is an expression of heightened irritability of the nervous system. (3) It may be present in tetany. Herbst in Berlin in 1910 examined 500 school children, in whom he most often discovered the sign in the fourteenth year. Sperk (*Wien. klin. Wochenschr.*, 1910, No. 5) concludes that the isolated facial irritability is rare in infancy, and that it increases rapidly from the fifth to the fourteenth year. He also points out that the sign when

present in older children occurs in nervous individuals who have increased knee jerks and diminished corneal reflexes. He believes that it is a helpful sign when found in conjunction with others in making a diagnosis of a neuropathic child. Hochsinger (*Wien. klin. Wochenschr.*, 1911), after examining all the children in his private practice for many years for the presence of this symptom, comes to the conclusion that, apart from its significance in tetany, it is a sign of a neuropathic constitution in a child. He found Chvostek's symptom frequently present in the mothers, less often in the fathers of the children showing it, thus emphasising the hereditary character of nervous signs. Out of 117 children exhibiting signs of nervousness, 101 showed this symptom. Of the mothers of these children 61 showed facial irritability. In boys the sign disappears about the sixteenth year, but in girls it remains to a much later date. The sign may disappear during the summer months and return during the winter.

Bass (*Amer. Journ. Med. Sci.*, July 1912), as the result of an examination of 495 children at the Mount Sinai Hospital for this sign, came to the following conclusions:—

1. Chvostek's sign was present in 3·2 per cent. of the cases attending the institution for treatment.
2. The sign becomes more frequent the older the child, up to 14 years.
3. The presence of so great a number of cases in America, where tetany is relatively an uncommon disease, is an argument in favour of regarding Chvostek's sign in older children as distinct from any connection with tetany.
4. The positive Chvostek in an older child means as a rule a neuropathic constitution. It seems especially common in children showing vaso-motor irritability.
5. Chvostek's sign is easily elicited, and should be more often used as an adjuvant in making the diagnosis of neuropathic children.

CLINICAL STUDIES ON TETANY.

Falta and Kalm (*Zeitschr. f. klin. Med.*, 1911), from a study of twenty-one cases of tetany, have formed the opinion that in the early stage the excitability extends over the whole nervous system. Their observations show that in the gastro-intestinal tract, as well as in other organs supplied by the involuntary nerves, symptoms of increased excitability occur in the acute stage of tetany, as well as other phenomena pointing to tetanic contraction. In some cases a rise of temperature occurs after the injection of substances which usually produce no pyrexia. During the acute stage the authors observed in a large number of cases symptoms of thyroidism developing, and an abnormal excitability of the motor, sensory, and special sense nerves. The following is a summary of the conclusions arrived at:—

1. The symptoms of tetany depend chiefly on a condition of excitability of the nervous system.
2. The site of this excitability is the ganglion cell, from which the whole nerve becomes affected.
3. The peripheral nerves are chiefly concerned, but nerves of a higher order can also be implicated.
4. In the acute stage of tetany every kind of nerve can be rendered irritable.
5. The excitability of the involuntary nerves is sometimes a mechanical and sometimes a chemical one.
6. Numerous symptoms of increased excitability are shown in the organs supplied by the involuntary nerves, viz. increased heart's action, spasm of vessels, oedema, hypersecretion of sweat, saliva, tears, spastic condition in the stomach, disturbances of temperature, etc.
7. In some cases symptoms of hyperthyroidism occur.

THE IMMUNITY OF INFANTS TO INFECTIOUS DISEASE.

Although the young infant appears to be particularly susceptible to infection through the digestive tract, causing diarrhoea and enteritis; through the respiratory passages, resulting in broncho-pneumonia; and by way of the skin, causing erysipelas and other cutaneous affections, there is an apparent immunity in the infant to the eruptive fevers, measles, scarlatina, chicken-pox, smallpox, typhoid and diphtheria, and to a certain extent to tuberculosis also. If young infants were as subject to those infectious conditions as older children, the mortality amongst them would be much greater, as the resisting power of the infant to serious diseases is less the younger he is.

It is impossible to explain this immunity of the infant, though possibly the exceedingly rapid growth and nutritive changes in the young child give the tissues bactericidal properties against certain infectious germs. Whatever the explanation may be, it is important to bear in mind that this immunity to many infectious conditions does really occur, and that epidemics of the eruptive fevers do not occur in assemblages of young children under a year old. When an epidemic of measles occurs in a crèche it is rare for it to commence among the little babies. It is almost invariably children between one year and four years who are first attacked (*La. Clin. Inf.*, 1911).

RENAL INFANTILISM.

Of recent years a good deal of attention has been paid to the subject of infantilism, and the paper under review by Miller and Parsons (*Brit. Journ. Children's Dis.*, July 1912) draws attention to a type of infantilism associated with, and apparently due to, a perversion

of the renal functions. The authors divide this condition on a pathological basis into two groups:—

Group 1. Renal infantilism associated with organic renal disease (interstitial nephritis).

Group 2. Renal infantilism without organic disease of the kidneys (diabetes insipidus).

The degree of infantilism present is variable. In most of the cases where organic renal disease is present the stature of the child is greatly below the average height of children of corresponding ages. The mental development usually corresponds to the stature rather than to the age of the child. When no organic disease is present in the kidneys the infantilism is of a less severe grade. *Genu valgum* has been noticed in several cases. It may be regarded as evidence of the imperfect osseous development which obtains in other types of infantilism.

Of more importance are the special characteristics of the renal class of infantilism. The most prominent of these are polydipsia and polyuria. The thirst is severe and may be the cause of the infant coming under observation. The polyuria is sometimes of a very severe type, as in one case where in twenty-four hours a patient passed a weight of urine equal to one-fourth of his body weight. Bed-wetting repeated two or three times nightly is likely to be present. As a result of the polyuria the skin of the patient is very dry and the face characteristically wrinkled. The complexion is of a pale yellow tint, and in some cases marked anæmia is present. In the group without organic renal changes all the symptoms are of a less severe type. The age when the symptoms are first noticed is of considerable interest. In many cases polyuria was noticed at birth, and in these, growth was impaired from infancy onwards; in others the child was stated to be normal for the first few years of life, the thirst, the polyuria, and retarded growth manifesting themselves at the same period of childhood. The urine is much increased in amount, averaging from 50 to 70 ounces per day, and is of a low specific gravity. Cardio-vascular changes are present, consisting of hypertrophy of the left ventricle, heightened blood-pressure, and thickening of the arterial walls. The etiology of the disease is somewhat obscure, although it is generally believed that cases coming under group 1 are due to chronic interstitial nephritis, and that those coming under group 2 are due to congenital syphilis and inherited nervous lesions. Hitherto no case of either type has been materially benefited by treatment.

EPIDEMIC OF POLIOMYELITIS IN CORNWALL.

The epidemic occurred in the little town of Penryn, with a population of 3000 (*Birmingham Med. Review*, January 1912). The houses are

old and insanitary, the sewage being discharged into the creeks and left exposed at ebbtide. The water supply is also very unsatisfactory. The epidemic consisted of 21 cases—14 males and 7 females—and there were five deaths. All the children who had their limbs affected or permanently impaired were under 8 years old. In all the cases without exception there was severe derangement of the intestinal tract; in some obstinate constipation was present, in others violent diarrhoea accompanied with large foul-smelling stools. Great pain and irritability was complained of when the paralysed limbs were touched or moved. Urticaria occurred in six of the cases. Only one case completely recovered.

The cases are divided into groups—(1) encephaloid type, numbering four cases; (2) gradual ascending or descending type, numbering seven; (3) sudden type, nine cases; (4) transient type, one case. There was one case in January, one in May, six in June, four in July, five in August, and four in September. During the course of the epidemic there were sixteen cases of herpes in the town, a very unusual number, which raised the suggestion that the same organism might be responsible for both diseases.

DISEASES OF THE EAR, NOSE, AND THROAT.

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MENINGITIS: ITS PATHOLOGY AND OPERATIVE TREATMENT.

KOPETZKY states (*Laryngoscope*, June 1912) that "all the symptoms that characterise meningitis are due fundamentally to common factors, whether the invading bacterium is one or another of the various organisms found standing in causal relationship to the lesion—to the poisoning of the central nervous system by the invasion of microbic organisms and the action of enzymotic ferments, plus the products of brain metabolism, which result in an acidosis of the tissues involved, producing an increasing tension of the cerebro-spinal fluid with disturbance of its normal circulation. Finally, relief of the symptoms may be accomplished by relieving the heightened intra-cranial tension and combating the general effects of the action of the poisons on the central nervous system."

The accumulation of cerebro-spinal fluid in meningitis diminishes the available space within the skull, and the symptoms produced correspond with those of cerebral anæmia. Kopetzky conducted experiments on

dogs to study the specific effects of cerebral anæmia. From his experiments—ligating both internal carotids—it is evident that anæmia of the brain produces increased tension, which rapidly reaches its maximum effect; and that the increased tension is as likely to be produced by depriving the parts of their normal arterial supply of blood as by a venous stasis. He also repeated Cushing's experiments on brain compression, and obtained exactly similar results. In the first place anæmia is produced; this anæmia stimulates the vaso-motor centre, which responds by driving the blood-pressure above the level to which the compression pressure has been put. If the compression force be raised, the blood-pressure curve follows it upwards. Kopetzky conducted experiments to show the analogy between experimentally-produced intracranial tension and increased tension resulting from infection of the meningeal spaces by pathogenic organisms, and succeeded in doing so to some extent. He concludes—(1) that the infection of the central nervous system results in an increase in the tension of the cerebro-spinal fluid, with functional disturbances of the vagus, the vaso-motor centre, and the respiratory centre; (2) that these symptoms dominate the clinical picture of meningitis; (3) that evidence of the increasing tension is obtainable by repeated manometric measurement of the blood-pressure, by the repeated study of the fundus of the eye, the results of lumbar puncture, and observation of the character and rate of the respiration.

The author next discusses the subject of cerebral oedema in meningitis, and arrives at the following conclusion:—"In the production of increased tension of the cerebro-spinal fluid the oedema of the brain tissue itself, in addition to an oedema of the tissues of the investing membrane, is the principal factor. The former impinges on the available space in the cranial vault, and the latter, in addition, interferes with the free circulation of the cerebro-spinal fluid." He produces evidence to show that in meningitis there is presented a condition of "combined acidity" in the cerebro-spinal fluid which interacts on the colloids of the brain and the investing membranes by producing an oedema of these tissues, which is further increased by the interference in the oxygenation of the central nervous system.

The writer next considers the effect of bacterial invasion in meningitis, and concludes: "The result of pathogenic bacterial growth in the central nervous system is evidenced by the early disappearance of the carbohydrate element in the cerebro-spinal fluid, and the presence in its place of nitrogenous products, the result of tissue destruction. These two factors, particularly the latter, produce those symptoms of general intoxication which in addition to the pressure symptoms make up the clinical picture of meningitis." The presence of a dextrose in the normal cerebro-spinal fluid has been established as a physiological fact, and its absence in acute infections of the meninges has been demon-

strated by other observers, but the recognition of its significance as one of the earliest diagnostic signs, and the explanation of its disappearance in acute bacterial infections, are due to Kopetzky. In his cases "the examinations in showing absence of the copper reduction were usually obtained long before the bacterial, cultural, or smear preparations gave information of diagnostic value." Besides being one of the earliest and most reliable signs of meningitis, it affords information as to the progression or retrogression of the infection of the meninges, for the carbohydrate reappears as the bacteria disappear from the fluid, because the carbohydrate is used as a food by the microbes.

The author next discusses certain biochemical changes in the cellular elements of the central nervous system. His general conclusions are: "In the evolution of meningitis the stasis, or the interference with the normal circulation of the cerebro-spinal fluid, causes an accumulation of the products of bacterial and enzymotic activity to take place in the fluid. The bodies thus collected are nerve poisons, and produce their deleterious effects directly on the cells of the central nervous system—evidence of which is seen in the clinical picture. The products of cellular degeneration thus formed and collected are recognised as penultimate products of disintegration of the protein constituent of the brain matter." A large part of the nervous tissue of man consists in the so-called myelin substances, among which lecithin is the best known. Lecithin breaks up through degeneration of nerve tissue into cholin and a glycerin-phosphoric acid: a further advance in the degeneration results in the formation of a glycerin, a neutral fat, and phosphorus. In the cerebro-spinal fluid of dogs in which cerebral anæmia has been produced, increased quantity of cholin was demonstrable. It occurred to the writer to search for the existence of products of the ultimate decomposition of lecithin, namely, to estimate the percentage of neutral fats in diseases presenting meningeal symptoms, and he details a procedure for doing this. A high percentage of fat was found in cases of anterior poliomyelitis and in purulent otitic meningitis.

From the study of the problems presented above it is seen that the factors which underlie the clinical picture of meningitis are the same in all its so-called types. The symptoms of meningitis fall into two general subdivisions—(1) those dependent on increased intra-cranial pressure; and (2) those dependent on the growth of bacteria, and on the decomposition products thrown into the circulation from the disintegration of nervous tissue.

Therapeutic measures which are directed only to control the second group of symptoms can have but a limited effect: the only logical treatment is to seek to control the intra-cranial pressure. The early diagnosis lies in the repetition of blood-pressure estimations at short intervals, the examination of the fundus, and a complete detailed examination of the spinal fluid.

In the same number of the *Laryngoscope* there is an important paper by Irving S. Haynes on the "Surgical Treatment of Meningitis." After giving a historical review of this subject he briefly refers to the anatomy and physiology of the parts. He points out that surgical treatment is the only possible treatment for meningitis, and that in the past this has usually failed either because the interference was insufficient, or because it has been delayed until the patient was moribund. He condemns ventricular puncture, because there is a risk of infecting a healthy ventricle in cases beginning with an external meningitis. Lumbar puncture, though invaluable as a diagnostic measure, is quite inadequate as a therapeutic remedy except in serous meningitis. An operation to be successful should be done early, and it should be to tap the cisterna magna at the base of the brain, because the cisterna magna lies close to the lower portion of the occipital bone, in a position favourable to operative attack; further, physiology shows that the flow of the cerebro-spinal fluid is from the ventricles into the cisterna magna, and the pathological changes in meningitis are greatest in this region. The purposes of the operation are to open the cisterna magna and relieve intra-cranial tension without danger of cerebellar hernia, and to provide free and continuous drainage of the infected cerebro-spinal fluid. The incision is in the middle line from the occipital protuberance to the spinous process of the axis, and carried down to the occipital bone and posterior arch of the atlas. The periosteum is then stripped from the occipital bone, which is bared for a distance of about one and one-half to two inches vertically, and an inch transversely, above the foramen magnum. A special self-retaining retractor (modified from Jansen's mastoid retractor) is now introduced. The de Vilbiss trephine (three-eighths of an inch) is applied in the middle line one inch from the margin of the foramen magnum and the button of bone removed. With the special dural separator the dura is loosened from the bone, and the de Vilbiss bone-cutter is used to make two lines of grooves into the foramen magnum. The wedge of bone cut loose is about half an inch wide at the foramen magnum and a little less wide at the upper border. The dura now presents, probably under pressure, bulging into the gap. The occipital sinus will be seen through the dura; if single, it should be tied with the special needles. The dura is incised carefully for the whole length of the wound; the arachnoid is then nicked, and as the cerebro-spinal fluid escapes, the blood-pressure, pulse, and respirations are carefully watched. When the excess of fluid has escaped the arachnoid is widely opened. A small wick of rubber or gutta-percha tissue is placed within the margin of the dura and arachnoid and left protruding from the wound. The muscles are replaced and held together by two or three plain gut sutures. The skin is closed above and below the drain. Voluminous dressings are applied to fill up the hollow between the head and neck. During

the operation the patient lies on his face with the head over the edge of the table, and supported by a special head rest. Haynes states that the operation is easy to perform, and it is not complicated by hernia of the cerebellum into the cranial opening, while plugging of the foramen magnum by the brain stem is impossible. Reports are given of operations on three moribund patients: all died, but it was shown that the operation was easy, and there was improvement in all the symptoms. A fourth fatal case operated on by Dr. Kopetzky is also detailed. The paper is fully illustrated.

DERMATOLOGY.

By W. ALLAN JAMIESON, M.D., F.R.C.P.,
Consulting Physician ;

and

R. CRANSTON LOW, M.B., F.R.C.P.,
Assistant-Physician to Skin Department, Royal Infirmary, Edinburgh.

THE CAUSE OF PSORIASIS.

UNTIL the cause of psoriasis is discovered, probably no great progress will be made either in its prophylaxis or treatment. For many years it has been taught that psoriasis is an hereditary or, more correctly, a family disease. Knowles (*Journ. Amer. Med. Assoc.*, 10th August 1912) has inquired into the family history of the disease in all cases met with during the last nine years. Hundreds of cases of psoriasis were seen, and only in six families was he able to prove the presence of other cases in the family. The mere questioning of patients as to the disease in other members of the family was found to be unreliable, because in many cases on investigation the other members of the family were found to be suffering from a skin disease other than psoriasis. The cumulative evidence points to psoriasis being of parasitic origin, and the occurrence of cases in the same family is probably due to infection from one case to another. Winfield (*ibid.*) holds the view that psoriasis is not primarily a parasitic disease, but that the fundamental cause is some disturbance of the metabolic function, which, by lowering the cutaneous resistance, renders the skin susceptible to the invasion of some special organism which causes the characteristic lesions. On that assumption he treated 40 cases of psoriasis by lactic acid and high irrigation of the colon, so as to combat auto-infection and disturbed metabolism from putrefaction and fermentation of the intestinal contents. Thirty of the forty cases received only lactic acid and colon irrigation, the remaining ten received in addition external treatment with chrysarobin ointment. In twenty-three cases the attack was cured, sixteen were improved. The cases treated were of all ages and all

were typical examples of the disease. The reason for the colon irrigation was because in Winfield's experience psoriasis are more or less constipated, and examination of the stools reveals the presence of mucus and shreds indicating the presence of some colitis. For this method it is claimed that the acute symptoms quickly disappear and recent patches clear up, and only in chronic very thickened patches is it necessary to use local treatment as well. In view of the fact that many cases of psoriasis improved under simple hospital rest, Winfield controlled his results by other cases similarly hospitalised and treated by the classical methods.

CANCEROUS DEGENERATION IN CHRONIC LEG ULCER.

Although chronic irritation of all kinds has been long recognised as predisposing to the formation of carcinomata, it is an extraordinary fact that carcinoma is very rare in chronic ulcers of the legs. The long duration of these ulcers, the want of cleanliness, and the carelessness of the patients with regard to them all tend to keep up a constant irritation. Gottheil (*ibid.* 6th July 1912) has only been able to find records of ten cases where carcinoma developed in this condition. He himself is able to add three to that number. They were all typical leg ulcers, all more or less neglected and showing decomposing secretions, but they were no worse than the average example of such ulcers. The thing which differentiated these cases from ordinary ulcers was the presence of tumour masses, with prominent tuberous and curled edges. Microscopically the growths were all shown to be cancerous. Two of the cases refused surgical treatment, but in one patient amputation was successfully performed. The possibility of a malignant complication in leg ulcers should stimulate the medical man to insist on having the ulcer treated till it is healed, and if it shows any marked proliferation at the edges to have it examined microscopically, and if malignant to recommend immediate amputation.

SULPHUR AND THIOLAN.

In the treatment of skin diseases sulphur is used either as a powder or as an ointment. If used as a powder, whether applied alone or as a lotion with water or spirit, it simply lies on the surface and does not affect the lesions in the skin. If used as an ointment very little absorption is also obtained, because the ordinary yellow sulphur is only very slightly soluble in fat. In order to overcome these difficulties Vörner (*Münch. med. Wochenschr.*, 1912, p. 1909) recommends that a concentrated solution of potassium sulphuratum in water be taken. This contains about 33 per cent. potassium sulphuratum and is a bright yellow fluid. The part to be treated is thoroughly washed and dried and the solution painted on or rubbed in and allowed to dry. On to

if the vapour of acetic acid is blown by a vapouriser, or a 5 to 10 per cent. solution of acetic acid is applied. By the chemical reaction which takes place the yellow colour disappears and the surface of the skin becomes covered with a thin layer of the finest powder. The sulphur thus precipitated comes into very intimate contact with the affected part of the skin. As a substitute for the ordinary sulphur ointment Vörner recommends the following:—In a kilo of ointment base 2 to 2·5 grms. sulphur are dissolved by heat; to that 50 grms. oleum sulphuratum and 40 grms. freshly precipitated and filtered calcium sulphuricum are added. Vörner gives this ointment the name of "Thiolan." It is an ointment containing sulphur partly dissolved and partly suspended as a very fine powder. Vörner claims that the ointment is much more effective than the ordinary one possessing the same proportion of sulphur. The effect of the ointment is also increased by the application of heat at the same time, the heat causing a considerable quantity of the suspended sulphur to become dissolved. If a weaker preparation is required the thiolan ointment may be diluted by other ointments, *e.g.* ung. borici. Vörner recommends thiolan for seborrhœa sicca, parasitic diseases, fungus diseases, and suppurative lesions, *e.g.* impetigo.

FIBROMA MOLLUSCUM GRAVIDARUM.

Under the above name Brickner (*Amer. Journ. Dermat.*, May 1912), has described a change in the skin occurring during pregnancy. Since the first case was described in 1906 Brickner has seen seven cases of the disease, and several other observers have also reported similar cases. The lesions usually appear in the fourth to sixth month of pregnancy as small slightly pigmented or non-pigmented sessile or pedunculated excrescences. They increase in number as pregnancy advances, until at full term they may number forty or fifty. Previous cutaneous diseases apparently play no rôle in their appearance. The excrescences usually lose their pigment within a few weeks or months after delivery and slowly disappear. The pregnancies of all the patients were quite normal otherwise. Neither itching nor pain are complained of. The growths are not sensitive to touch. The pigment in the growths is darker in brunette women. Many of them, however, remain of the colour of the surrounding skin, but the older the lesions the more likely they are to be pigmented. The lesions are usually seen only about the front and sides of the neck. They also occur in the neighbourhood of the clavicles and under the breasts. In one case they extended down the back as far as the angle of the scapula. Lesions have never been seen on any other part of the body or limbs. They are always of small size, varying from a pinhead to half a split pea. They may be sessile or have a small pedicle. They are not grouped according to any particular arrangement. The pigment varies

from a yellow to a yellowish or dark brown colour. The smaller ones are digitate, the larger polypoidal in character. After they disappear they leave no scar. Microscopically the tumours have the ordinary structure of fibromata, such as are seen in ordinary molluscum fibrosum. The pigment is situated in the basal cells of the Malpighian layer of the skin. The etiology is obscure, but Brickner considers that it is a metabolic change evoked by pregnancy. The diagnosis is easy. The only lesions for which they might be mistaken are ordinary warts, but the presence of the peduncle should prevent that mistake. The prognosis is good. The lesions in the great majority of cases gradually disappear spontaneously within a few months after delivery. No treatment is required unless they cause annoyance to the patient, when they can be snipped off with scissors.

DIPHTHERIA OF THE SKIN.

For more than a century diphtheritic affections of the skin have been known, but it is only within recent years that the multiformity of such lesions has been recognised. The usual lesion of the skin always occurs on some abraded surface, very often in the situation where a blister has been applied. It is most often associated with diphtheria of the throat, but may occur as a primary infection of the skin. The lesion consists of a raised area with a bluish-red edge, the centre being covered with a membranous exudate. The exudate increases in amount and becomes very fetid, and accumulates as a thick yellow or blackish crust on the surface. Considerable areas of the skin may be affected. The prognosis is serious, but with the ordinary serum treatment internally and local antiseptic treatment the lesions usually clear up rapidly. The danger consists in their not being recognised as diphtheritic lesions, and this is especially so where the skin lesion is the primary one; but such cases practically always occur in persons who are coming in contact with cases of throat diphtheria. The diagnosis is made by a microscopic examination of the membrane or crusts on the surface of the lesions. The commonest form is seen in children, and has the appearance of an impetiginous dermatitis, almost always affecting the head and face and often associated with a severe conjunctivitis and sometimes otorrhœa and rhinitis. Verbizier (*Ann. de Dermat. et Syph.*, February 1912) reports several cases of skin diphtheria of peculiar appearance, and has collected accounts of other uncommon forms of the disease reported by others. In one case the eruption consisted of numerous bullæ of the size of cherries on the neck, arms, and face. They were arranged in groups, appeared suddenly on an erythematous base, and each lesion lasted about a week. The eruption had commenced three months previously and was very itchy. The case was diagnosed at first as dermatitis herpetiformis.

The contents of the bullæ were examined bacteriologically and gave a pure culture of the diphtheria bacillus, which on inoculation into guinea-pigs caused death within 28 hours. After two injections of diphtheria antitoxin the lesions disappeared completely. Several cases are also reported where there was an eruption of pustules on the face, arms, etc., with lesions on the conjunctiva, lips, and vulva. In other cases gangrenous lesions surrounded by a bright red areola have been seen. Other cases began behind the ears and spread from there over the face. Some of these seem to be secondary diphtheritic infections on the top of a previous seborrhoeic dermatitis. Diphtheria may also be inoculated accidentally on wounds or scratches of the hand, producing a lesion not unlike anthrax, but the bacteriological examination enables a correct diagnosis to be made. If diphtheria affects the vulva it may spread to the groins and up over the abdomen, producing ulcerating lesions. In males an ulcerating diphtheritic lesion of phagedenic type may occur on the penis. All these suppurative lesions resemble often very closely the lesions of ecthyma. Verbizier also records a case of extensive diphtheria in the child which produced a vulvitis clinically very like the ordinary gonococcal vulvitis and a large suppurative lesion like a boil on the arm. Both from the vulva and the furuncle-like lesion the Löffler's bacillus was obtained, and all the lesions got rapidly well after the use of serum.

From all these cases it is seen that diphtheria, when it affects the skin, may cause lesions like impetigo, herpes, furunculosis, pemphigus, etc., and all skin lesions occurring in persons with diphtheria or in those who are nursing or coming in contact with such cases should be looked upon with suspicion and examined for the diphtheria bacillus.

NEW BOOKS.

A Guide to Midwifery. By DAVID BERRY HART, M.D., F.R.C.P.
Pp 765. With 4 Illustrations in Colour and 268 Diagrams.
London: Rebman, Ltd. Price 25s.

A TEXT-BOOK on midwifery by Berry Hart raises high expectations. He belongs to a school with a great tradition in this subject. His own contributions have earned a world-wide reputation for him. Of the present teachers of this subject in Britain he stands in the forefront. Such a reputation arouses great expectations, and the present book realises them. Of the splendid services he has rendered to scientific midwifery the *Guide to Midwifery* will stand as the enduring record. In these days of colourless writing, when originality is sunk in the

desire to say all that can be said on a subject, it is refreshing to read a book in which the writer selects the topics on which he has something to say. Such writing affects the style, and Dr. Hart has a style of his own. His former students on turning to any page of this book will at once recognise their teacher and even hear the tones of his voice.

The name—*A Guide to Midwifery*—is suggestive. It is not a manual, a handbook, but a finger-post directing attention to the most important subjects. From this arises one of the weak points of this work. In some parts the critic will call it scrappy should he happen to light on a subject on which the writer thinks he has nothing special to say. It will also be said that the *Guide* is not a book for students. A man who wishes what will enable him to pass an examination may not find here all he wants, but the true student, having learned what can best be taught, not by books, but by tutorial classes and practical demonstrations, will find here the most profitable form of reading to gather up and systematise his knowledge. The teacher will find this work indispensable. From the preface we learn that the *Guide* has been written in two parts, the first giving a succinct account of midwifery from a modern standpoint, with, at the end of each chapter, instructions as to what practical work should be done and what specimens should be examined in order that the student may know the thing itself so far as that is possible. This covers the first 600 pages. Another further 150 pages is devoted to notes and discussions elucidating difficult points.

The note of the book is struck in the opening sentence: "Midwifery more than any other department of surgery lends itself to a form of demonstration almost Euclidean." The subject-matter is arranged in a manner fitted to give the student a grasp of the whole. The writer is a born teacher, and if he does not always give the details, he gives a strong framework into which they can be built. His method is, as far as possible, to start with an anatomical basis, selecting and describing specimens. The strongest parts of the *Guide* are those which lend themselves best to this method, and those in which the writer has made special contributions—e.g. the anatomical changes in labour and in extra-uterine gestation. The mechanism of labour is also lucidly described; and in the operative sections, that on forceps is admirable. Evidence of his wide reading will be found in the graphic illustration of hyperemesis taken from the account of the death of Charlotte Brontë; and that and his racy style come out in "Old methods of third-stage management for which moderns take credit."

In the "Development of the Ovary" there is an interesting digression on the origin of the primitive germ-cells and the bearing of the changes in these before fertilisation on the question of heredity. The

writer here enters on a subject on which there is room for much speculation, and in which he has taken up a distinct position and thrown out some suggestive hypotheses. In the condensed reference to them in the Notes he hardly does himself justice. The reader will require to turn to that interesting book, *Phases of Evolution and Heredity*, which Dr. Hart published a year ago, and in which he gives a fruitful way of thinking out the problem of heredity. While, however, one type of mind thinks in "biophors" and "determinants," another finds it easier to think in terms of "engrams." Further, the "mnemic" theory offers a solution of such facts as the influence of the host on the germ-epithelium in the case of buds grafted, and the change of deciduous trees into evergreens in a new environment, which the Weismannian can only explain by saying that they do not occur.

A Clinical Manual of the Malformations and Congenital Diseases of the Fœtus. By Professor Dr. R. BIRNBAUM. Translated and annotated by G. BLACKER. M.D., B.S., F.R.C.P., F.R.C.S., Obstetric Physician to University College Hospital, etc. Pp. 379. With 58 Illustrations in the Text, and 8 Plates. London: J. & A. Churchill. 1912. Price 15s. net.

PROFESSOR BIRNBAUM'S work, which is already well known in Germany, deserved to be translated into English, for it gives a capital account of the clinical aspects of congenital diseases and malformations, so far at least as they appeal to the gynæcologist. For the surgical treatment of malformations the reader is referred to text-books of surgery. Some of the subjects dealt with have, however, a very slight clinical interest: such are the acardiac monsters. On the other hand the clinical aspects of hermaphroditism or rather of pseudo-hermaphroditism, are much greater than the author's treatment of the subject would lead one to think. Still there was a real need for some such work as this, which places the clinical side of these matters well in the foreground, and Professor Birnbaum of Göttingen has supplied the deficiency very thoroughly. Dr. Blacker has done much more than translate the book into good English; he has annotated it with care and copiousness, thereby adding a hundred pages. He has also increased the number of illustrations, and he has brought into the work material supplied from more purely English sources which were less easily available to the author. The publishers have done their part well and have turned out a handsome volume.

The Surgical Clinics of John B. Murphy, M.D., at Mercy Hospital.
Published bi-monthly. Parts 1-4, Vol. I. Philadelphia: W. B. Saunders Co. 1912. Price 35s. per year.

THIS publication is neither a systematic text-book of surgery nor a collection of complete papers on special subjects. It is a series of records of bed-side clinics and theatre demonstrations given for post-graduates at Mercy Hospital, Chicago, by Dr. Murphy. The reports are given *verbatim*, often in the form of question and answer, and with no attempt at literary style or exhaustive discussion — a method successfully employed in the Edinburgh School many years ago by Dr. Byrom Bramwell.

The plan is one which only a really great clinical teacher could venture to adopt, and even if we had no further evidence of Dr. Murphy's claim to this distinction than the records now before us, we would be constrained to place him in the front rank.

From the graphic way in which the clinical aspects of the cases are presented, the excellent illustrations, and the lucid expositions by which the lessons of each case are enforced, this contribution to the literature of clinical surgery is of the highest educational value.

We look forward with pleasure to the appearance of the succeeding issues, and trust the publication may have a long run.

Surgical Operations. By FRIEDRICH PELS-LEUSDEN, Berlin. Translated by FANTON E. GARDNER, M.D., New York. Pp. 726. With 668 Illustrations. London: Rebman, Ltd. 1912. Price 30s. net.

THIS work is addressed to students and practitioners, and will appeal to English readers chiefly as a succinct and clearly written exposition of the present-day practice of surgery in the Berlin school. The subject-matter is arranged on the usual lines, and the whole field of operative surgery is covered. Each operation is clearly described, and the illustrations, although simple, serve to amplify the text. The translator has rendered the work into excellent English.

Principles of Human Physiology. By ERNEST H. STARLING, M.D. Pp. 1423. London: J. & A. Churchill. 1912. Price 21s. net.

IN this rather bulky volume we are provided with an admirable account of modern physiology, and its general excellence is a striking illustration of the ability and industry of the author. Although the book is as clearly written as the nature of the subject permits, it is by no means light reading, and we are in cordial agreement with the author in recommending the student to read a primer of physiology

in order to obtain a bird's-eye view of the subject before beginning a study of this work. The volume is divided into four books. The first deals with the structural and chemical basis of the body, and the physics of the energetic basis of the body is admirably dealt with: Book II. deals with the mechanisms of movement and sensation: Book III. with nutrition, and Book IV. with reproduction, the last containing a useful résumé of recent views on inheritance.

As might be expected in a volume of such size from the pen of one author, there are inequalities of merit in different sections. The introductory chapters and the sections on the special senses, metabolism, digestion, and respiration are particularly good. There are a few imperfections, and it is in no captious spirit that we refer to some we have noticed. In the historical account of cerebral functions Broca's localisation of the speech centre is referred to without comment, while, later, we find that the author favours Marie's view that cases of motor aphasia are to be explained by a lesion of Wernicke's area, together with anarthria due to interference with fibres from the capsule.

The figure on page 761 illustrating the position of the soft palate during deglutition is apt to give a wrong idea of the action of the epiglottis. Professor Starling's hæmatological lore does not appear to reach the same high plane that other chapters indicate. On page 920 the number of leucocytes per c mm. is put as 18,000 to 36,000. Even the lower figure is about three times the normal human average. On page 922 the old confusion between osteoclasts and myeloplaxes is repeated, and the paragraph on the formation of leucocytes is a curious mixture of antiquated and modern views. On page 944 iodine is given as an ingredient of Hayem's solution. Fig. 381, page 994, representing a scheme of the circulation, shows an arrangement of valves which would effectively prevent the action that it is intended to explain.

These defects do not greatly detract from the merits of the book, and we can heartily commend it as a masterly exposition of the subject.

A System of Treatment. By many Writers. Edited by ARTHUR LATHAM, M.A., M.D.(Oxon.), etc., and T. CRISP ENGLISH, M.B., B.S.(Lond.), etc. Vol. IV. Obstetrics and Gynæcology. Pp. xxix.+883. Numerous Illustrations. London: J. & A. Churchill. 1912. Price 21s.

THE fourth volume of this *System of Treatment* deals entirely with obstetrics and gynæcology; the former subject is subdivided into general management of pregnancy, complications and abnormalities of pregnancy, management of normal labour, management of labour in

special presentations, complications and abnormalities of labour, management of the normal puerperium, complications of the puerperium, affections of the breasts, management of the new-born child, and obstetric operations; and the latter subject is arranged under headings which are partly regional and partly symptomatic, viz. general points in gynæcological surgery, management of puberty and the menopause, diseases and affections of the vulva, vagina, uterus, ovaries, Fallopian tubes, broad ligaments, and urethra and bladder, and leucorrhœa, disorders of menstruation, disorders of the sexual function, and pseudohermaphroditism.

The editors have gone to Dr. Hastings Tweedy for the discussion of the management of normal labour, to Professor Munro Kerr for an account of Cæsarean section, and to Dr. Cameron for the subject of amenorrhœa and scanty menstruation. The rest of the contributors are resident in England, with the exception of the two Edinburgh representatives, Drs. N. T. Brewis and J. W. Ballantyne, who write respectively on endometritis and hypertrophy of the cervix, and on the management of pregnancy, of puberty, and the menopause. Mr. (now Sir) John Bland-Sutton deals with subjects on which he is eminently well fitted to speak—ectopic pregnancy and diseases of the Fallopian tubes and broad ligaments; Professor Hellier has diseases and affections of the vulva allotted to him; Dr. W. E. Fothergill writes on diseases and affections of the vulva; Dr. Russell Andrews on diseases and affections of the ovaries; Dr. J. R. Freeland on the management of the new-born child; and Dr. Comyns Berkeley on several of the obstetric operations. Among the writers on other subjects are Drs. Thos. G. Stevens, C. E. Purslow, Cuthbert Lockyer, Darwall Smith, Eardley Holland, G. Blacker and Blair Bell, and Mr. Victor Bonney. Professor Carliss Swayne writes on cellulitis.

On turning to some of the moot points in obstetric practice we find that Dr. Eardley Holland is not favourably impressed with early rising in the puerperium ("the results have not been uniformly good enough to justify its general adoption"); for post-partum hæmorrhage Dr. Cuthbert Lockyer relies upon evacuating the uterus, securing permanent contraction (retraction), and making up for the loss of blood; the operation of pubiotomy is critically considered ("it has yet to be shown what are the special advantages of these operations over Cæsarean section or craniotomy, and whether any of them are suitable for the emergencies of general practice"); and the value of vaccine treatment in puerperal infection is left undetermined—a wise decision. Under the heading of anæsthetics in labour occurs the statement "the drug originally employed by Simpson for the relief of labour pains was chloroform;" on the contrary the drug originally used by Simpson was ether, and he continued to use it from January to November 1847, when he discovered the anæsthetic properties of chloroform and substi-

tuted it for ether. This should be corrected in a second edition of the *System*.

The gynæcological articles reach a high level of accuracy and completeness, and as they deal with less contentious matters they call for little criticism. It might, perhaps, have been well to have employed the plan adopted in the obstetric part of the volume and have drawn together into one section the chief gynæcological operations, such as ovariectomy, hysterectomy, and reparative procedures.

The volume, as a whole, is deserving of praise, and is sure to receive a hearty welcome from the profession. The illustrations are clear and distinct and really explain the text, and the index (which also opens up the contents of the other three volumes of the *System*) is full and, so far as we have tested it, quite accurate.

ERRATA.

- P. 366. For "Erich Muller," read "Erich Kindborg."
 P. 377. For "David M·Kail," read "David M·Vail."
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NEW EDITIONS.

Dictionary of Treatment. By Sir WILLIAM WHITLA, M.D., Professor of Materia Medica, Queen's University, Belfast. Fifth Edition. London: Baillière, Tindall & Cox. Price 16s. net.

THE fact that this dictionary has reached a fifth edition is ample evidence that the efforts of the author have met with well-merited success. As in former editions, the therapeutics of medical, surgical, ophthalmic, and cutaneous affections have been included, and in the present edition the articles dealing with the therapeutics of gynæcology and obstetrics have been entirely entrusted to Dr. Robert Johnstone, member of the staff of the Royal Victoria and of the Belfast Maternity Hospital. The work as a whole is an admirable text-book on therapeutics; its thoroughly practical character makes it probably the most complete and useful text-book on the subject. We have noted a few minor defects which might with advantage be remedied in subsequent editions. In discussing the treatment of bronchitis and asthma, no reference is made to the necessity of a careful bacteriological examination of the expectoration with the view in appropriate cases of the application of vaccine treatment, the value of which in some cases is undoubted. In rheumatoid arthritis we are told that vaccine treatment should have a trial in desperate cases, a polyvalent streptococcic vaccine being recommended in such cases. On the whole, there is little evidence that such a vaccine is useful;

it is of greater importance to direct the practitioner to the necessity of carefully looking for evidence of bacterial invasion in each case, with the view, if possible, of obtaining an autogenous vaccine. In the treatment of diabetes no mention is made of the therapeutic advantages of an occasional "hunger day." We think it would be a distinct advantage if in future editions a much fuller account of vaccine therapy is given, both in its general and special aspects, the same practical and detailed information being given as is characteristic of the dictionary as a whole.

A Practical Text-Book of the Diseases of Women. By ARTHUR H. N. LEWERS, M.D., F.R.C.P.(Lond.). Seventh Edition. Pp. xi. + 540. Demy 8vo. London: H. K. Lewis. Price 12s. 6d. net.

A TEXT-BOOK which has run to its seventh edition may quite legitimately claim to be exempt from criticism, and, were it not that the present edition contains much new matter, a review would be superfluous.

Dr. Lewers's book is designed as a "practical text-book," and it is an eminently sound guide to the practice of gynæcology. It is always a matter of opinion whether the interpolation of case records is as instructive as it is meant to be, and many will regret that some of the space so occupied has not been given to a brief discussion of modern work on gynæcological pathology.

The reader turns with expectation to the chapters on cancer of the uterus and is not disappointed. The description and discussion are the work of one who has made himself a master of the subject. The recent operative advances are described lucidly, and are not over-elaborated. The practical aspects of fibroid and ovarian tumours are also most excellently dealt with.

For a practical text-book remarkably little is said of the whole subject of flexions and versions of the uterus. No doubt a great deal too much may be made of these, but the author is content to shatter in the most approved fashion the older erroneous views without substituting any discussion of the innumerable minor symptoms that, whether causally or not, are so frequently associated with these conditions.

The illustrations are numerous and good. Special commendation must be given to the newer photographs of actual specimens, and to the micro-photographs, which are all very typical and instructive. The coloured plates cannot be praised, but that is probably the fault of the reproduction rather than of the artist.

ANALYTICAL REPORTS.

LEVICO WATER.

(HERZ & COMPANY, LONDON.)

WE have received from the importers samples of this well-known arsenio-ferric water. The waters are bottled without dilution, and do not undergo any manipulation whatever. At Levico are two springs, known as Levico mild and Levico strong respectively; the former contains $\frac{1}{20}$ gr. of arsenious acid and 8 grs. of iron salts per pint, while the latter contains $\frac{1}{12}$ gr. of arsenious acid and 34 grs. of iron in the same volume. Levico waters have a well-deserved reputation in the treatment of anæmia, certain skin diseases, glandular enlargement, syphilis, nervous disorders, and other conditions in which iron and arsenic are indicated, and ought to be better known in this country. The importers supply schedules giving outlines of the method of carrying out a home "cure."

TABLOID EPININE. TABLOID PHYSOSTIGMINE.

TABLOID PILOCARPINE.

(BURROUGHS WELLCOME & Co.)

Tabloid Epinine contains $\frac{1}{1000}$ gr. of the synthetic substance with an adrenalin-like action to which the name has been given by Messrs. Burroughs Wellcome & Co., together with small doses of heroin, ipecacuanha, benzoic acid, and oil of gaultheria. The tabloids are intended to be sucked so as to produce a local effect on the mouth and throat. The product is useful in congested and irritable conditions of the pharynx and larynx, and ought to be of service to public speakers and others whose calling makes demands on the vocal organs.

The same manufacturers also submit to us two of their ophthalmic tabloids, containing respectively $\frac{1}{1000}$ gr. physostigmine salicylate and $\frac{1}{3000}$ pilocarpine nitrate. The value of these ophthalmic tabloids is well attested. Those which we mention are useful additions to the oculist's armamentarium.

CODEONAL.

(KNOLL & Co., LONDON.)

Recent research has shown that the action of narcotic alkaloids is enhanced by the addition of lipid soluble hypnotics (*i.e.* the choral and sulphonal group), and advantage of this fact has been taken by Messrs. Knoll in preparing codeonal, which is a combination of codeine with diethyl barbituric acid (veronal). Each tablet contains $2\frac{1}{4}$ grs. sodium diethyl barbiturate and $\frac{1}{4}$ gr. codeine diethyl barbiturate. Codeonal has given good results in insomnia due to cough, dyspnoea, and other painless conditions, and is suitable for occasional use as a general hypnotic. The dose is two tablets or, in bad cases, more.

BOOKS RECEIVED.

A SYSTEM of Surgery. Vol. II. Edited by C. C. Choyce	(Cassell & Co.)	21s.
ADAMI, J. G., and J. M'CRAE. A Text-Book of Pathology	(Macmillan & Co.)	25s.
ADAMSON, H. G. Goulstonian Lectures on Modern Views upon the Significance of Skin Eruptions	(Bale, Sons & Danielsson)	3s. 6d.
ARMSTRONG, E. F. The Simple Carbohydrates and the Glucosides. Second Edition.	(Longmans, Green & Co.)	5s.
AULDE, John. The Chemic Problem in Nutrition (Magnesium Infiltration) (Philadelphia)		—
BENNETT, R. R. Materia Medica and Pharmacy. Second Edition	(H. K. Lewis)	4s. 6d.
CALENDAR of the School of Medicine of the Royal Colleges, Edinburgh, Session 1912-13		—
CHAPMAN, A. Chaston. Brewing	(Cambridge University Press)	1s.
DAKIN, H. D. Oxidations and Reductions in the Animal Body (Longmans, Green & Co.)		4s.
EMERY, W. D'Este. Clinical Bacteriology and Hæmatology. Fourth Edition.	(H. K. Lewis)	7s. 6d.
FIFTY Doctors against Alcohol	(Brotherhood Publishing House)	2s. 6d.
FLEXNER, A. A Report to the Carnegie Foundation for the Advancement of Teaching, Bulletin No. 6		—
FOX, S. F. Mother and Baby	(J. & A. Churchill)	1s. 6d.
GIBBON, I. G. Medical Benefit in Germany and Denmark	(P. S. King & Son)	6s.
GIBBS, J. H. The Extraction of Teeth	(E. & S. Livingstone)	7s. 6d.
HART, Bernard. The Psychology of Insanity	(Cambridge University Press)	1s.
HAWTHORNE, C. O. Studies in Clinical Medicine	(John Bale, Sons & Danielsson)	6s.
HERTZLER, A. E. A Treatise on Tumours	(J. & A. Churchill)	30s.
HEWITT, F. W. Anæsthetics and their Administration. Fourth Edition (Macmillan & Co.)		15s.
HUTT, C. W. Hygiene for Health Visitors, School Nurses, and Social Workers (P. S. King)		7s. 6d.
KEIBEL, F., and F. P. MALL. Manual of Human Embryology. Vol. II.	(Lippincott)	—
M'CRAW, J. Aids to the Treatment of Diseases of Children. Fourth Edition	(Baillière, Tindall & Cox)	3s. 6d.
M'KENDRICK, A. Malingering and its Detection	(E. & S. Livingstone)	1s. 6d.
MARTIN, A., and P. JUNG. Pathology and Treatment of Diseases of Women. Fourth Edition	(Rebman, Ltd.)	21s.
MILLER, H. C. Hypnotism and Disease	(T. F. Unwin)	5s.
MOON, R. O. The Prognosis and Treatment of Diseases of the Heart (Longmans, Green & Co.)		3s. 6d.
OSTROM, K. W. Massage and the Original Swedish Movements. Seventh Edition	(H. K. Lewis)	3s. 6d.
PORTER, W. G. Diseases of the Throat, Nose, and Ear	(John Wright & Sons)	7s. 6d.
PRACTICAL Medicine Series. Vol. II. General Surgery. Edited by J. B. Murphy (Chicago)		2 dols.
ST. LUKE's Hospital Medical and Surgical Reports. Vol. III., 1911	(New York)	—
ST. THOMAS's Hospital Reports. Vol. XXXIX. Edited by J. J. Perkins and C. A. Ballance	(Churchill)	8s. 6d.
SCHULTZ, F. The X-Ray Treatment of Skin Diseases	(Rebman)	12s. 6d.
STODDART, W. H. B. Mind and its Disorders. Second Edition	(H. & K. Lewis)	12s. 6d.
THIRTY-FIFTH Annual Report of the Board of Health of the State of New Jersey, 1911		—
WILLIAMS, J. W. Obstetrics. Third Edition	(Appleton & Co.)	25s.

EDINBURGH MEDICAL JOURNAL.

EDITORIAL NOTES.

National Insurance Act.

A MONTH ago we pointed out the wisdom of reopening negotiations with the Government in the hope of securing, even at the eleventh hour, a settlement of the present deadlock. The decision of the Representative Meeting conforms to that advice, and proves that there exists among the members of the Association a willingness to sink sectional differences of opinion and to compromise on a course of action to which all can loyally adhere. The prospect, so far as it is affected by the unity of the profession, of securing justice is brighter than in the beginning of November we ventured to hope.

The resolution to refuse service under the present regulations, carried by an overwhelming majority, is a very striking manifestation of professional opinion. It is within our own knowledge that the strongest opposition to the conditional "concessions" now comes mainly from the best class of practitioners—the very men who are least inclined to quarrel over sixpences, and to whom chaffering about money is not rendered less distasteful by being necessary. The men least apt in driving a bargain with the State will not be eager to put their pride in their pocket and grasp at payments to which derogatory and harassing conditions attach. The present solidarity of the profession rests as much on an instinctive desire to protect its ideals and traditions as on the more material basis of profit and loss.

Another reason for believing that the tide flows in our favour is the character of the voting for the motion to confer. The ballot was not between "accept," "confer," "reject," but between "to confer" and "not to confer." Close as the vote was, there was actually a negligible majority in favour of a motion which merely indicated that the Association would consider any further offers by the Government—a motion nearer to the "countercheck quarrelsome" than to the "retort courteous." So that as matters stand we have the whole Association declining to act, a small majority opposed to making any advances, but falling in with the desire of the minority to confer on precisely defined terms. Be it further noted that the Association passed over, almost without remark, Mr. Lloyd George's hint that he would not negotiate except with plenipotentiaries, and resolved that if any conference did take place it must be on ground of the Association's choosing, and subject to ratification by the divisions.

A third reason for optimism lies outwith the merits of the case.

The events of the past few weeks in the field of general politics have not strengthened the position of the Government.

What proposals the Association will make to the Government we do not know. The committee appointed has strong men on it, and will command general confidence. No undue haste need be displayed. Experience shows that the whole subject bristles with difficulties, and every condition or regulation will require careful, lengthy scrutiny. The nearing of 15th January is no reason for our being hurried into premature decisions—the delay is not due to any fault of the British Medical Association.

**Medical Benefit in
Germany.**

IN Germany a comprehensive scheme of compulsory insurance has existed since 1884.* There the difficulties that exist here have had their counterpart, and from the way in which they have been, and are being, met, we can derive some hint as to the probable trend of events in this country.

German medical benefit is administered by the friendly and other societies themselves: they arrange their terms directly with the doctors. The supervising authorities only intervene in the case of disputes, generally to insist that medical service shall be adequate. Thus it comes about that in Germany the conditions are not unlike what exist in ordinary contract practice here, or what would exist were the medical benefit suspended and paid to the funds of the societies. In passing, it may be said that under the German law medical benefit must be paid in kind: payment of money to individual insured persons is not contemplated. One of the chief evils pertaining to the system has been the under-payment of the doctors, but this has been effectively met by organisation, and although in some localities the remuneration falls below what is asked, the doctors have in practically every instance succeeded by combination in enforcing their demands. Attempts have, of course, been made by the societies to resist these encroachments, notably in Leipzig, where the District Sickness Society had (1904) about 140,000 members. Failing to settle with the local practitioners the Society imported doctors to whom they guaranteed £300 a year, and established consulting centres under whole-time medical officers. The plan was an utter failure: of 75 doctors engaged only 62 came, and ultimately the supervising authority was compelled, by the inefficiency of the service, to make terms with the local profession over the heads of the Society. On account of the system adopted in Germany, the remuneration varies in different districts, and it is impossible, owing to the difference in the cost of living, to make any useful comparison with what is claimed in this country. In general, however, after

* *Medical Benefit: A Study of the Experience of Germany and Denmark.* By J. G. Gibbon, B.A. London: P. S. King & Co. 1912.

making allowance for local conditions, the German doctors appear to be at least as well paid as we expect here to be. The method of remuneration also varies: that which appears to work best on the whole is the pooling system. In some localities the insured person contributes directly towards the cost of his medical benefit.

Apart from money matters, freedom of choice of doctor has caused many conflicts. The German profession adheres as strongly to the principle as we do in this country, and they have not only gained their end, but have converted some of the large societies to see eye to eye with them in this matter. Control and supervision of medical work, especially in relation to the granting of certificates and economy in dispensing, has produced endless friction. The plan which has been evolved as most suitable is for the organised doctors to elect one (or more) of their number in whom they place trust, who then becomes salaried confidential medical adviser to the societies and exercises general supervision over the working of medical benefits, admits members, etc. This plan has grown up out of and has superseded the entrusting of supervision and control to a committee of the doctors.

The general tendency in Germany apparently is for the control of medical benefits to pass more and more into the hands of the organised medical profession, and Mr. Gibbon foresees that this tendency will spread to include institutional as well as domiciliary treatment. Thus voluntary hospitals would be extinguished, and the corporate doctors, being pecuniarily interested, would check the abuse of institutional at the expense of home treatment.

It is the experience of Germany that compulsory insurance produces malingering and, what is much more subtle and difficult to prevent, valetudinarianism. The latter is a more widespread evil, and a greater menace to the health of the community. The only feasible means of hindering its growth appears to be education, and imposing, as is done in some localities, direct contributions towards medical benefit on sick insured persons.

The outstanding feature of the history of medical benefit in Germany is this: the medical profession, by uniting in opposition to the rule of the societies, has invariably obtained a very large measure of success; and, what is more, the establishment of corporate associations of doctors face to face with federated groups of friendly societies has lessened friction between the two parties and has enhanced their mutual esteem.

Royal College of Surgeons of Edinburgh.

THE following gentlemen, having passed the requisite examination on 13th July last, were admitted Fellows of the College:—

George W. Bury, M.B., Ch.B.(Vict. Univ. Manc.), Stoke-on-Trent; Robert G. M. Clements, M.D.(R. Univ. Irel.), Belfast; James G. Cornack, L.R.C.S.E. (Triple Qual.), Peking; Arthur Fells, M.B., C.M.(Edin.), Bristol; Howell W.

Gabe, M.R.C.S.(Eng.), L.R.C.P.(Lond.), Morriston, Glam. ; Norman J. Gerrard, M.B., B.S.(Melbourne), Australia ; Arthur C. Hendrick, M.B.(Toronto), Toronto, Canada ; Corrie Hudson, D.S.O., M.R.C.S.(Eng.), L.R.C.P.(Lond.), Major, I.M.S. ; John W. Illius, M.R.C.S.(Eng.), L.R.C.P.(Lond.), Captain, I.M.S. ; Fritz Kahlenberg, M.R.C.S.(Eng.), L.R.C.P.(Lond.), Dunedin, New Zealand ; Vaughan Lloyd-Evans, M.B., Ch.B.(Edin.), Warwick ; Ronald B. Macfie, M.B., Ch.B.(Edin.), Edinburgh ; Alexander McMurray, L.R.C.S.E. (Triple Qual.), Belfast ; Leonard Myer, M.R.C.S.(Eng.), L.R.C.P.(Lond.), London ; Charles T. H. Newton, M.D.(Edin.), Christchurch, New Zealand ; Gerrard F. Porter, M.D., Prestwich, Manchester ; William Ross, M.B., Ch.B.(Edin.), Sea View, Forres ; William E. Scott-Moncrieff, M.D.(Edin.), Major, I.M.S. ; Arthur A. Straton, M.R.C.S.(Eng.), L.R.C.P.(Lond.), M.B., Ch.B.(Lond.), Wilton, Salisbury ; Leonard W. O. Taylor, M.B., Ch.B.(Edin.), Nottingham ; William S. Thacker, M.D.(Dublin), Dublin.

Royal College of Physicians of Edinburgh, Royal College of Surgeons of Edinburgh, and Royal Faculty of Physicians and Surgeons of Glasgow.

THE following candidates, having passed the requisite examinations of the above Board in October, were admitted Diplomates in Public Health :—

Edward L. Middleton, Forfarshire ; Alexandra B. MacCallum, Strontian, Argyll ; John D. Ingram, Melrose ; John C. MacCallum, Strontian, Argyll ; Dewan J. Chand, Bahawalpur, India ; William G. Macdonald, Glasgow ; Kate Fraser, Paisley ; Jane H. McIlroy, Co. Antrim ; George C. Strathairn, Edinburgh ; Daniel C. Adam, Melbourne, Australia ; Alexander J. Ewing, Tarbat, Ross-shire ; George V. T. McMichael, Edinburgh ; Peter Allan, Whitburn.

THE quarterly examinations of the above Board, held in Edinburgh, were concluded on 26th November, with the following results :

The following candidates passed the first examination :—James Pearson, Jr., South Shields ; W. J. Sweeney, Co. Donegal ; A. M. Morris, London ; Elfrida H. B. Coghill, Dublin ; and H. C. A. Haynes, Australia.

The following passed the second examination :—G. B. Charnock, Manchester ; T. W. Drummond, Greenock ; J. S. A. Rodgers, Melbourne ; J. J. de Waal, British Guiana ; G. L. Stanley, Bristol ; J. F. Sweeney, Australia ; A. C. Taylor, Seaton Sluice ; N. A. Martin, North Shields ; W. H. O'Grady, Co. Mayo ; B. C. Haller, London ; and W. H. Wray, Derry.

The following passed the third examination :—S. Swaminathan, India ; N. Ryland Whitaker, Edinburgh ; V. H. Wardle, Bishop Auckland ; R. McC. Paterson, India ; Annabile Caruana, Malta ; J. E. Kitchen, Hebden Bridge ; W. T. M. Sebeta, Basutoland ; A. M. Burge, Australia ; D. S. Graham, Fermanagh ; J. K. Venables, New Zealand ; and A. I. Clarke, Belfast.

The following passed the final examination :—A. G. Cowper, Bombay ; J. McFarlane, Jarrow-on-Tyne ; D. S. Puttanna, Doddballapur ; N. R. Ubhaya, India ; William Martin, Co. Down ; Eslyn M. Marcar, India ; William Watson, Co. Tyrone ; Alexander F. D'Souza, Bombay ; Charles J. L. Patch, Madras ; Hamilton Mathewson, Co. Tyrone ; Walter Lessey, Grenada ; H. S. Dastur, India ; V. C. H. Dearden, Sheffield ; and John I. Arnold Co. Wexford.

AURICULAR FLUTTER.*

By W. T. RITCHIE, M.D., F.R.C.P.,
Assistant-Physician, Royal Infirmary, Edinburgh.

THE term "flutter," as applied to the action of the human auricles, was first employed by Jolly and the writer⁷ to designate a series of rhythmic co-ordinate contractions of the auricular muscle occurring at a rate of about 270 per minute in a case of auriculo-ventricular heart-block. The case had been described previously both by Gibson³ and myself,¹⁴ and polygraphic records had demonstrated that from June 1905 until August 1910 the auricles had been beating rhythmically at a rate of 246 to 300, except on three occasions when they were found to be contracting at a rate of 43.7 to 57.3 per minute. It was not until August 1909, however, that Jolly and I, working in the Physiological Department of the University of Edinburgh, were able to demonstrate the auricular action in this case by means of the string galvanometer. We found that the auricular deflexions in the electro-cardiograms were rhythmic, and that they were diphasic when the action currents were led off from the right hand and left foot (Derivation II.), or from the left hand and left foot (Derivation III.). Further, we showed that the electro-cardiographic deflexions of auricular fibrillation in the human subject differed from those in auricular flutter in being irregular, of greater rate (390 to 522 per minute), and in not presenting a diphasic curve. In adopting the term "auricular flutter" to describe the rapid, rhythmic, auricular beats, we drew attention to the researches of MacWilliam,¹⁰ who stated that the application of the faradic current "sets the auricles into a rapid flutter . . . the rhythmic movements consist of a series of contractions originating in the stimulated area and thence spreading over the rest of the tissue. . . . The movement does not show any distinct sign of inco-ordination."

The patient (Case I.) in whom we demonstrated auricular flutter more than three years ago is now 63 years of age. He enjoys a fair degree of health, and is able to take a daily walk of at least two miles, in the course of which he climbs, without discomfort or distress, one of the steepest hills in Edinburgh. He has been examined on many subsequent occasions. All the evidence indicates that the complete auriculo-ventricular dissociation still persists, and that the auricles are invariably in rapid

rhythmic flutter, which has thus continued incessantly (except on three occasions) for more than seven years.

Since this case was recorded in 1905 several other cases have been reported in which the rate of auricular contraction was markedly accelerated. In the case recorded by G. A. Gibson⁴ in 1906, the patient was a man aged 44, suffering from chronic adhesive pericarditis, but without any valvular lesion. The rate of the rhythmic auricular beats, as shown by jugulo-carotid tracings, was 168 per minute, rising subsequently to 350 per minute, while the ventricular rate was usually about 40 per minute. In Fig. 2 of Dr. Gibson's paper the auricular rate, 168, was exactly four times greater than that of the ventricles. Alexander Morison's¹² case of jugular embryocardia, observed in 1903 and recorded in 1909, was one of mitral disease, in which the "auricular contractions usually bore to ventricular systole the ratio of 208-228:108-114," and the sounds produced by the quick rhythmic auricular beats resembled those of the fetal heart. During the patient's residence in hospital for four months the condition persisted continuously. In the case described by Hertz and Goodhart⁵ in 1909, a woman aged 39, with mitral disease and hemiplegia, the auricular rate was almost constantly 234 and that of the ventricles about 80 per minute. This patient, like my first case of auricular flutter, was "comparatively well for most of the period of observation," and "was up and performing her household duties for the last seven months." Rühl¹³ reports three cases of persistent "auricular tachysystole"—(1) Joiner, aged 55, suffering from palpitation and dyspnoea on exertion. The auricular rate was 285 to 300, rising on one occasion to 315 per minute. The ventricular rate was 70 to 150. The condition persisted during the whole month that the patient was in hospital. (2) Waitress, aged 32, with mitral disease, palpitation, dyspnoea, and dropsy. An auricular rate of 206 to 222 persisted probably for eighteen months. The rate of the ventricles was usually 52 to 72 per minute, their rhythm being either irregular or rhythmic, and with occasional paroxysms in which the rate rose to 180 to 200 per minute. (3) Labourer, aged 72, complaining of palpitation and cough. The auricular rate was 200 to 214 and the ventricular rate 100 to 207 per minute. Mackenzie's¹⁴ case (No. 37 of his series), an officer complaining of great prostration and consciousness of rapid and fluttering action of the heart, presented a ventricular rate of 130 to 150, rising occasionally to 290 to 300 per minute, and with an auricular rate that probably varied only

from 280 to 320. Case No. 38 of Mackenzie's series, a man aged 74, in whom a rhythmic ventricular tachycardia at a rate of 150 per minute was associated with a ventricular venous pulse, may also be included here. In the case recorded by Lewis, a man aged 60, complaining of dyspnoea, cough, and dropsy, an auricular rate of 300 and a ventricular rate of 150 were recorded. The same writer refers to five other cases of similar nature in which the rates of auricle and ventricle were 313 and 156.5, 260 and 130, 320 and 160, 224 and 112, 334 and 167 respectively. In one of these cases the excessive rate is said to have persisted for three years.

When the jugulo-carotid tracings or electro-cardiograms from these cases are analysed, it becomes evident that in most instances the rate of auricular systole bears to that of the ventricles the ratio either of 2:1 or 4:1, and that the rate of the ventricles may be doubled suddenly, for example from 70 to 140, while the auricular rate remains unchanged. In Hertz and Goodhart's case the records show that the ratio of auricular to ventricular rate was sometimes 3:1. In other instances, such as Gibson's case, the auricular rate was sometimes more than four times that of the ventricles; and in the case recorded by Jolly and myself there was complete heart-block, with about eight auricular beats for each contraction of the ventricles.

Since 1909, when Jolly and I obtained electro-cardiographic proof that the human auricles may be in constant flutter at a rate of 275 to 300 per minute, no further case in which I could determine definitely the presence of auricular flutter came under my notice until May of this year, when Dr. William Russell asked me to record electro-cardiograms from a case under his care in the Royal Infirmary. Within the last three years, however, I had obtained records from several patients in whom the auricles were probably fluttering at one time or other; and last winter Dr. W. E. Hume showed me a case from whom he had obtained records demonstrating very clearly an auricular flutter which subsequently passed into fibrillation. In August of this year Dr. James Mackenzie described to me several cases of auricular flutter that he had observed, and I have to acknowledge to him my sincere thanks for indicating to me the particular clinical and therapeutic problems, such as the action of digitalis, which required elucidation. Soon after that conversation with Dr. Mackenzie I had the opportunity of studying two further cases of auricular flutter. Both patients were in Professor Wyllie's ward, of which

I was then in temporary charge, and I have to acknowledge my indebtedness both to Professor Wyllie and to Dr. William Russell for their kind permission to record the three following cases:—

CASE II.—Traveller's porter, aged 45 years, was admitted to Ward 34 on the 9th August 1912 complaining of shortness of breath and of pain in the left side of the chest for two months. He stated that twenty four years previously he had suffered from syphilis, for which he was treated for three months. Following the primary sore his throat became affected, and most of his hair fell out, but he considered that he had been free of any subsequent ill effects. Four and a half years ago he was confined to bed for two months on account of rheumatic pains in the feet and legs: and two years ago he met with an accident, necessitating an amputation through the left forearm. He had been a moderately temperate man. With the exception of slight palpitation during the past twelve months, he was in good health until eight weeks ago, when he began to feel short of breath on carrying his parcels up flights of stairs. Day by day the dyspnoea became more pronounced, and he now began to suffer from pain in the left side of the chest and in the epigastric region. The pain usually came on at night, for example when he was going upstairs after his day's work was done. The pain in the epigastrium was localised at an area three inches below the infra-sternal notch, and this area was tender on deep pressure. This pain bore no relation to the taking of food, but was always aggravated when the breathing was embarrassed, and became less severe when he sat quietly. He did not complain of nocturnal dyspnoea, he had never felt faint or lost consciousness, and he had never noticed any signs of dropsy.

On admission to hospital he was a well-nourished man, measuring 5 ft. 8½ ins., and weighing 133 lbs. He was rather bald for his years, but presented no signs of cyanosis or dropsy. The chest was well formed. The cardiac impulse was strong and unduly diffuse, the apex-beat being at a point in the sixth left intercostal space, four inches to the left of the mid-sternal line. As ascertained by percussion, the right border of the heart lay one and a half inches to the right of the mid-sternal line. Over the mitral area a loud blowing systolic murmur was audible. It was conducted round the left side of the chest, and was faintly audible at the lower end of the sternum. A moderate degree of venous pulsation was visible in the right side of the neck. The arterial pulse was at the rate of 138 per minute, rhythmic and of good force. The walls of the radial arteries were somewhat thick, but the vessels were not tortuous. The systolic blood-pressure was 152 mm. Hg, as ascertained by the Riva-Rocci sphygmomanometer. He had a slight cough but no expectoration. The respiratory rate was 28 per minute. The breath sounds were of normal character, with

a few medium crepitations and rhonchi at the base of each lung. Neither the liver nor spleen were enlarged. The patient passed 35 ozs. of urine in 24 hours: it had a specific gravity of 1024, and contained a trace of albumin. No tube casts were detected.

Progress—16th August.—The patient has been resting quietly in bed, and taking ten minims of tincture of digitalis with half a grain of sodium nitrite thrice daily since his admission, and now feels decidedly better. He passed 70 ozs. of urine to-day. He still has palpitation but no pain. The pulse has been constantly frequent 120 to 140 per minute—and rhythmic. The liver is now considerably enlarged, extending down to the level of the umbilicus in the right mammillary line. Electro-cardiograms recorded to-day show that the auricles are beating rhythmically at a rate of 283.0, while the rate of the rhythmic ventricular beats is exactly one-half, namely, 141.5 per minute (Plate I, Fig. 1). Pressure both on the right and on the left

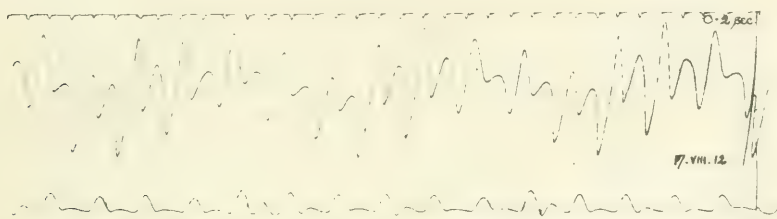


FIG. 1, Case II.—Jugulo-carotid and brachial tracings. The rate of the arterial pulse is 136.3 per minute. The jugular pulse is of the ventricular form.

vagus causes transient slowing of the ventricles, but they soon escape from vagus inhibition and resume their former rate of contraction.

17th August.—Polygraphic records show a ventricular venous pulse. The ventricles usually contract rhythmically at a rate of 136.3 per minute, each pulse period in the sphygmogram being about 0.44 sec. (Fig. 1). In other parts of the record there are groups of 3 to 5 rhythmic ventricular beats, each intersystolic period measuring about 0.44 sec. Each group of beats is separated from that which precedes or that which follows it by a period of about 0.72 to 0.80 sec., and the sphygmogram shows marked alternation of the pulse beats in each

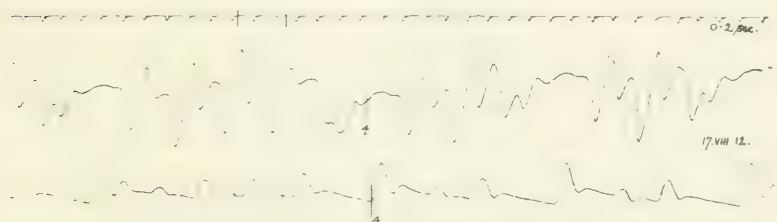


FIG. 2, Case II.—Jugulo-carotid and brachial tracings. The beats of the arterial pulse are in groups, and also present alternation.

group. The first beat of each group is represented by a large pulse-wave: the second ventricular beat is rhythmic, but the corresponding pulse wave is small, and its transmission is much delayed (Figs. 2 and 3).

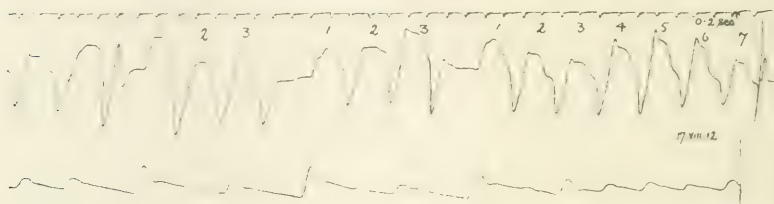


FIG. 2. Case II.—Tracings from the apex-beat and brachial artery, showing two groups, each consisting of three rhythmic ventricular beats, and seven rhythmic beats of another group. The groups are separated from one another by comparatively long diastolic pauses. The first ventricular contraction of each group is represented by a large wave in the sphygmogram; the second ventricular systole is represented by a small wave, which is delayed in transmission.

18th August.—The patient slept ten hours last night, and feels much better. In electro-cardiograms the auricles were seen to be beating rhythmically at a rate of 280.4, and the ventricles likewise rhythmically at a rate of 140.2 per minute. Pressure upon the right vagus caused transient slowing of the ventricles, whereas the auricular rate remained unchanged. He passed 60 ozs. of urine to-day, and the dose of digitalis tincture was increased to twenty minims thrice daily.

19th August.—The auricles were beating rhythmically at a rate of 276.4 per minute. The ventricular beats were usually rhythmic at a rate of 138.2 per minute—As : Vs : : 2 : 1 : but every now and again the ratio was 4 : 1, and at these times the auricular deflexions were diphasic.

20th August.—The patient passed 95 ozs. of urine, having a specific gravity of 1015, and still containing a small amount of albumin.

22nd August.—He slept about ten hours last night, has no dyspnoea and no dropsy, and considers that he would be fit for his work if he were allowed to get up. The sodium nitrite was stopped, and the dose of digitalis tincture was reduced from 20 to 10 minims thrice daily.

23rd August.—The radial pulse was rhythmic at a rate of 72 per minute.

24th August.—The arterial pulse was 68 per minute and rhythmic.

25th August.—The pulse was rhythmic at a rate of 72 per minute.

26th August.—In electro-cardiograms the auricles were beating rhythmically at a rate of 268.4 : the ventricular beats were rhythmic at a rate of 67.1 per minute—a constant ratio of As : Vs : : 4 : 1. The auricular deflexions were diphasic.

27th August.—Patient passed 70 ozs. of urine, which was free of albumin. The dose of digitalis was increased to 15 minims thrice daily.

28th August.—Electro-cardiograms showed that the auricles and ventricles were beating rhythmically at 274.28 and 68.57 per minute respectively, the ratio of As : Vs :: 4 : 1 being constant. The auricular deflexions were still diphasic. Pressure upon the right vagus did not retard the auricles, but caused transient slowing of the ventricles (Plate I., Fig. 3). For each pulse-beat in the sphygmogram there are four waves in the jugulo-carotid tracing. The two waves occurring during ventricular diastole are small. The two waves occurring during ventricular systole are larger, and the first of them occurs immediately after, and is fused with, the carotid wave (Fig. 4).

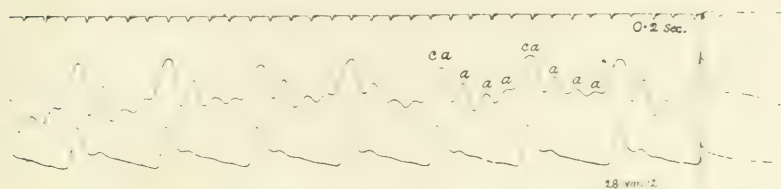


FIG. 4. Case II. Jugulo-carotid and brachial tracings recorded on the 28th August 1912. The auricular and ventricular rates are 274.28 and 68.57 respectively.

29th August.—The auricles and ventricles were beating at rates of 281.0 and 70.25 respectively, with a constant ratio of As : Vs :: 4 : 1.

30th August.—The dose of tincture of digitalis was increased to 20 minims thrice daily.

31st August.—Electro-cardiograms indicated that the auricles and ventricles were beating rhythmically at rates of 274.28 and 68.57 respectively, with a constant ratio of 4 : 1, and that the auricular deflexions were still diphasic.

2nd September.—The patient was allowed up yesterday: he slept for nearly ten hours last night, and had no pain or palpitation. To-day he was walking about the ward, and felt quite well. Electro-cardiograms showed the auricles and ventricles were beating rhythmically at rates of 274.2 and 68.55 respectively, the ratio of As : Vs :: 4 : 1 being constant except when pressure upon the right vagus retarded the ventricles, although it exerted no influence on the auricular rate.

5th September.—The arterial pulse has remained uniformly rhythmic, and its rate has varied only from 68 to 72 per minute. To-day the auricular rate is 274.2, the ventricular 68.55 per minute.

7th September.—Electro-cardiograms taken yesterday showed that the ratio of As : Vs :: 4 : 1 was still constant. To-day the dose of digitalis tincture was increased to 30 minims thrice daily.

9th September.—The patient felt well, and was walking about the ward and corridor. The arterial pulse was found to be wholly irregular at a rate of 62 per minute. Electro-cardiograms (Plate I., Fig. 4) revealed auricular fibrillation. The auricular deflexions were at a

rate of about 467 per minute. They were not uniformly rhythmic and were no longer diphasic (Plate I., Fig. 4).

10th September.—The ventricles were beating wholly irregularly at a rate of about 60 per minute. Electro-cardiograms showed small irregular auricular deflexions at a rate of about 457 to 500 per minute. Many of the ventricular beats were represented by atypical deflexions. None of these atypical beats were premature; on the contrary, each was preceded by a long diastolic pause. In one part of the record three atypical beats occurred in series. The digitalis was stopped—he had taken 1575 minims in the course of 32 days. An orthodiagram (Fig. 5)

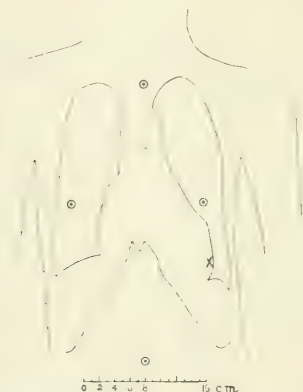


FIG. 5. Case II.—Orthodiagram of heart and aorta, recorded on the 10th September 1912. The record was taken at the end of tranquil inspiration.

showed that all the diameters of the heart were considerably enlarged: the long diameter from the cavo-auricular junction to the apex was 18.3 cm.; the curves of the right auricle and left ventricle extended outwards 6 and 9 cm. respectively from the mesial line. The left auricular curve was absent: the pulmonary and aortic curves on the left side were somewhat more prominent than normal.

11th September.—The auricles were still in fibrillar contraction. In electro-cardiograms the rate of the auricular deflexions was about 476 per minute: the ventricular rate was about 65 per minute, with inter-systolic periods of 0.73, 0.99, 1.29, 1.22, 0.85, 0.67, 0.84, 0.91, 0.64, 0.71, 1.01 sec.

14th September.—The rhythm of the ventricles has remained wholly irregular. Electro cardiograms recorded on the 12th and again to-day showed auricular fibrillation.

15th September.—The ventricles were still irregular at a rate of 76 per minute. The maximum systolic pressure was 140, the diastolic pressure 90 mm. Hg.

16th September.—Continuous irregularity of the ventricles—the rate was 86 per minute. Administration of mercury and iodide was commenced.

19th September.—The pulse was wholly irregular, with a rate of 88 per minute.

About a fortnight later the patient was not so well : the pulse rate had become more frequent, the administration of mercury and iodide was stopped, and digitalis was again administered. On the 22nd October, the last occasion on which the patient was seen, the auricles were still in fibrillation.

CASE III.—Male, aged 37, married, but without children, was admitted to the Royal Infirmary on the 25th February 1912, under the care of Dr. G. A. Gibson, to whom I am indebted for the following notes :—The patient was complaining of swelling of the abdomen, and of an uncomfortable feeling after taking food. He had suffered from acute rheumatism three times—when 15, 22, and 27 years of age—but denied having suffered from venereal disease. He was a moderate drinker. For about six weeks he had been complaining of shortness of breath, especially on exertion, but he had not experienced any pain, palpitation, or faintness. On admission he was listless and markedly cyanotic, but not dropsical. He was 5 feet 6½ inches in height, and weighed 137 lbs. The heart was enlarged, the apex-beat being in the 6th left intercostal space, 4½ inches from the mid-sternal line. A loud systolic and a softer diastolic mitral murmur were constantly audible : a rough presystolic mitral murmur could usually be heard, but it was not constant. The arterial pulse was rhythmic and not unduly frequent, the walls of the radial arteries were not palpably thickened, and the maximum systolic pressure did not exceed 110 mm. Hg. Electro-cardiograms recorded on the 28th February and on the 7th March 1912 showed that each auricular beat was followed by a ventricular contraction. The patient was treated with strychnine and digitalis, and was discharged on the 28th March 1912 much improved.

He was readmitted on the 21st July 1912 under the care of Professor Wyllie. The patient was then complaining of shortness of breath and swelling of the feet and ankles. He sometimes had palpitation at night, but had not suffered any pain. On several occasions he had felt faint, and had to grasp a railing to steady himself.

The apex-beat was situated 5½ inches to the left of the mid-sternal line. Considerable pulsation was visible, both in the epigastrium and in the jugular veins on the right side of the neck. The same mitral murmurs were audible as when the patient was in hospital previously. The arterial pulse was rhythmic, and its rate was 94 per minute. Examination of the lungs revealed no abnormality : the urine was scanty and contained albumin.

To Professor Wyllie's Resident Physician, Dr. J. M. Murray, I am indebted for the following clinical notes of the patient's progress:—He was given a milk diet, and five minims of tincture of strophanthus and ten grains of potassium citrate were administered thrice daily. On the 23rd July he began to take 10 grains of diuretin thrice daily. On the 24th July the patient was feeling better. He passed 148 ozs. of urine, and the oedema had lessened. His pulse-rate had varied from 84 to 96 per minute. On the 26th July there was some sickness, and tincture of digitalis in five-minim doses thrice daily was substituted for strophanthus. The rate of the pulse was 88, and its rhythm was regular.

On the 31st July the pulse was at a rate of 76, and regular. The patient felt very well. The oedema had disappeared and the digitalis was stopped. By the 9th August he had improved steadily and was feeling very well, but he was still kept in bed, and he continued to take potassium citrate and diuretin. His pulse-rate varied from 68 to 72 per minute. On 15th August he was allowed to get up for a short time. The pulse-rate had been 68 to 72 per minute. On the 17th and 18th he was feverish (temperature 100·0° F.). On the 20th August the legs were again oedematous: his pulse-rate had been about 80 to 98 per minute, and he was again confined to bed. On the 1st September his pulse-rate was 92 to 98, and he commenced to take 10 minims of tincture of digitalis thrice daily.

On the 7th September the patient's condition was decidedly worse, and hardly any pulse could be felt at the wrist. On the following day his condition was much the same.

On the 9th September his arterial pulse-rate was 160 per minute: the beats were rhythmic and equal, but of small volume. Marked pulsation was seen in the jugular veins, and tracings taken at 1.15 P.M. revealed a ventricular venous pulse (Fig. 6). He

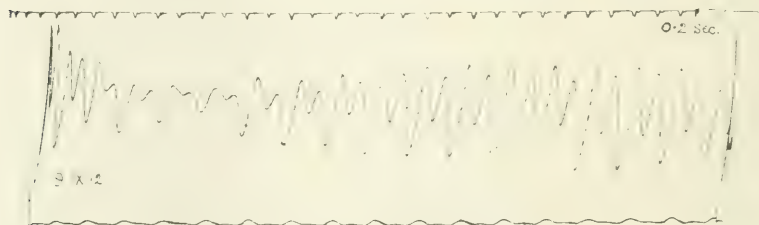


FIG. 6, Case III.—Jugulo-carotid and brachial tracings. The arterial pulse-rate is 159·5 per minute. The jugular pulse is of the ventricular form.

vomited once early in the afternoon. Electro cardiograms (Plate II., Figs. 1, 2, and 3) taken at 3 o'clock showed that the auricles were beating rhythmically at a rate of 320, while the ventricular beats were rhythmic at a rate of 160 per minute. From 5.28 until 5.30 P.M. the ventricular rate, estimated from a venous pulse tracing,

was constantly 162·1 per minute. At 5.31 P.M. 0·001 gramme of strophanthin (Boehringer) was given intravenously, and a polygraphic record was taken every minute until 6.1 P.M. This record showed that the ventricular rate fell to 155·2 at 5.33, varied from 153·8 to 162·1 until 5.41, and remained constant at 157·9 from 5.42 until 5.59. At 6 o'clock the rate was 162·1, and at 6.1, half an hour after the injection, the rate was 161·3. At 6.3 P.M. pressure upon the right vagus retarded the ventricles for a few seconds, after which they resumed their former rate. At 8 P.M. the arterial pulse had fallen to 128 per minute, and its rhythm was irregular. He vomited several times during the evening, and complained of some pain in the muscles of the arm into which the injection had been given. He slept poorly.

On the following day (10th September) he felt better, though still troubled with cough and dyspnoea. The lungs presented no signs of oedema. The arterial pulse was less frequent (96 to 104 per minute) and of larger volume, but it was wholly irregular for the first time. An electro-cardiogram (Plate II., Fig. 4) showed both the disorderly action of the ventricles and the small irregular quick deflexions characteristic of auricular fibrillation. The auricular deflexions were at a rate of about 400 per minute. The dose of tincture of digitalis was increased to 15 minims thrice daily.

On the succeeding day (11th September) he looked and felt decidedly better. He had slept well and the feet had become less oedematous. The arterial pulse was perfectly rhythmic at a rate of about 90 per minute. Electro-cardiograms, recorded by Derivations I., II., and III., showed that each auricular beat was followed by a ventricular contraction, and that the As—Vs interval was 0·15 sec. (Plate II., Figs. 5, 6, and 7). In these electro-cardiograms the auricular and the ventricular deflexions were of the same form as those in the records taken six months previously.

On the 13th September he remained fairly well, and his pulse was rhythmic at a rate of 98 per minute. On the 14th and 15th he was obviously worse, his face having an icteric tint. His pulse was 90 to 100, and rhythmic. In electro-cardiograms recorded on the 14th, each auricular beat was seen to be followed by a ventricular contraction. On the 16th the right knee became swollen and painful. He was given aspirin thrice daily, and on the 17th the joint had improved. His pulse was rhythmic at a rate of 100 to 102 per minute. On the 18th the pulse was still rhythmic, and at a rate of 88 to 96; the dose of digitalis tincture was reduced to five minims thrice daily. On the same evening, however, he was suddenly seized with severe breathlessness. Examination of the chest revealed evidence of a pleural effusion. After 25 ozs. of fluid had been withdrawn he was somewhat relieved for a time, but the dyspnoea soon recurred. It was not relieved by $\frac{1}{100}$ gr. of strophanthin given subcutaneously, and the patient died on the following morning.

On comparing the auricular deflexions when the auricles are in flutter (Plate II., Figs. 1, 2, and 3), with those when the auricles are beating quietly (Plate II., Figs. 5, 6, and 7), it is evident that the former, especially those recorded by Derivations I. and III., are of abnormal form.

CASE IV.—Railway clerk, aged 21, has had enlarged glands and sinuses in the neck since he was seven years old, but otherwise has enjoyed good health, and has never suffered from acute rheumatism, chorea, scarlatina, or syphilis. In May 1911 he suffered from palpitation for two or three weeks whenever he exerted himself. He could then feel his heart beating forcibly and at a great rate. The attack of palpitation might pass off in a few minutes, or might persist for two or three days, and would then prevent him from sleeping. In November 1911 the palpitation recurred, and was associated with vertigo, which was even more troublesome. Both symptoms used to ensue whenever he underwent any unusual exertion, for example when he ran upstairs, or after a wrestling bout, but at all other times he felt perfectly well. On one occasion, after running, he nearly fainted. He has never experienced any pain or dyspnoea. He had been off work for fourteen weeks when he was admitted to the Royal Infirmary under the care of Dr. Russell in May 1912. He remained in hospital for five weeks. A fortnight later he resumed his work, and has since felt perfectly well, without the slightest trace of palpitation or vertigo. He has no valvular lesion, and the heart is not enlarged.

Electro-cardiograms taken on the 10th May 1912 showed that the ventricles were beating irregularly in response to supra-ventricular stimuli. The ventricular periods estimated from an electro-cardiogram were 0.45, 0.42, 0.35, 0.77, 0.43, 0.49, 0.45, 0.45, 0.49, 0.39, 0.49, 0.35, 0.45, 0.80, 0.42, 0.49, 0.45, 0.43, 0.45, 0.49, 0.42, 0.35 sec. These figures indicate that the ventricles were usually beating at a rate of about 122 to 133 per minute, and that there was a comparatively long diastolic pause after a group of several frequent beats. The ventricular arrhythmia is illustrated in Plate I., Fig. 5, where each of the longer pauses is approximately equal to the sum of the two antecedent ventricular periods. The auricular rhythm is also irregular. There are series of 8 to 10 auricular beats occurring wholly, or almost, rhythmically at a rate of 256 to 270 per minute, and terminating in a diastolic pause of about 0.7 sec. duration (Plate I., Fig. 5). The irregularity of the ventricles is due in part to the auricular irregularity, and more especially to the occurrence of a comparatively long auricular diastole every now and again. The ventricular irregularity, however, is also due to the fact that even when the auricles are beating fairly rhythmically successive ventricular contractions occur in response to a varying number (for example, 4, 2, 3, 2, etc.)

PLATE I.

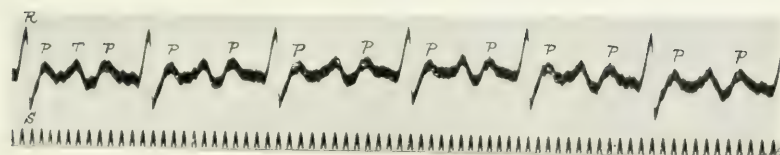


FIG. 1. Case II. 16, viii, 1912 (see p. 488).

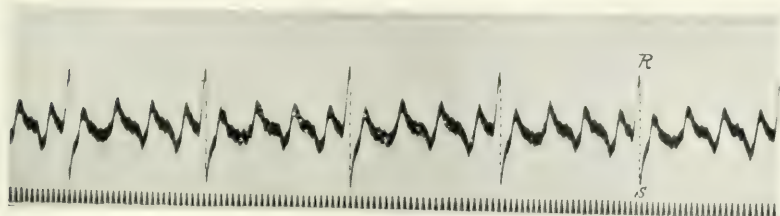


FIG. 2.—Case II. 29, viii, 1912 (see p. 488).

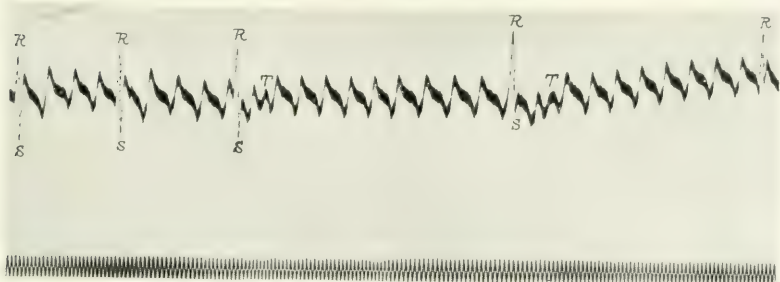


FIG. 3. Case II. 28, viii, 1912 (see p. 488).

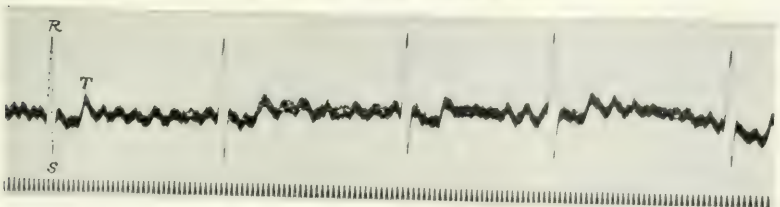


FIG. 4. Case II. 29, ix, 1912 (see p. 488).

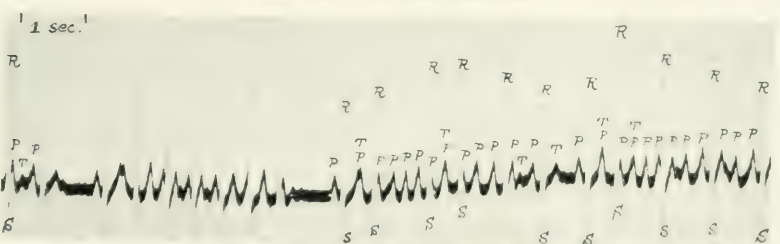


FIG. 5. Case IV. 10, v, 1912 (see p. 490).

PLATE I.—Figs. 1, 2, 3, and 4 are electro-cardiograms recorded by Derivation II. from Case II., Fig. 5 is from Case IV. by the same derivation. In each record the tension of the string was adjusted so that, with a magnification of 450 diameters, a difference of potential of 1 millivolt introduced into the circuit containing the patient and galvanometer gave a deflexion of 1 cm. The auricular deflexions are indicated by the letters P, R, S, and T are

PLATE II.

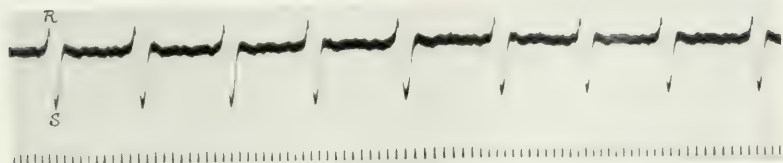


FIG. 1.—Auricular flutter. Derivation I. 9, ix, 1912.

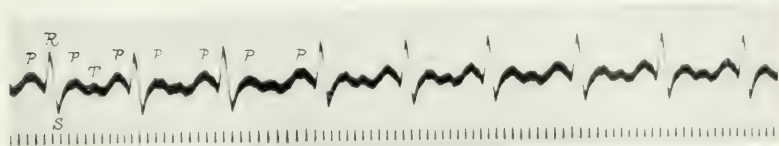


FIG. 2.—Auricular flutter. Derivation II. 9, ix, 1912.

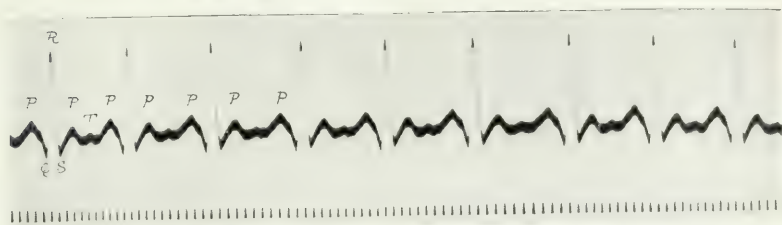


FIG. 3.—Auricular flutter. Derivation III. 9, ix, 1912.

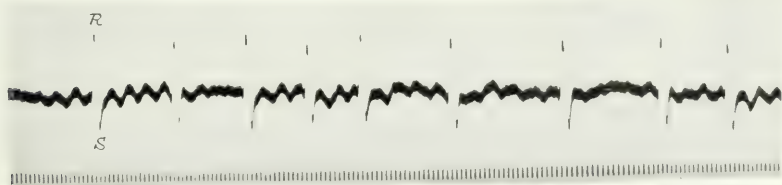


FIG. 4.—Auricular fibrillation. Derivation II. 10, ix, 1912.

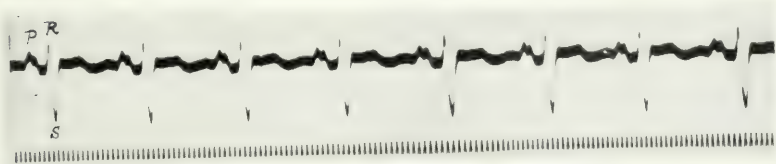


FIG. 5.—Normal rhythm. Derivation I. 12, ix, 1912.

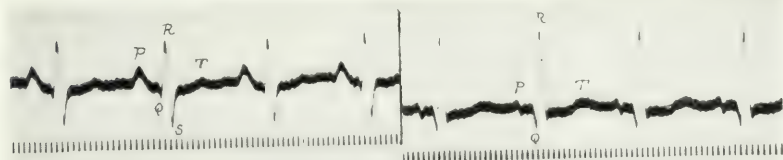


FIG. 6.—Normal rhythm. Derivation II.
1, ix, 1912.

FIG. 7.—Normal rhythm. Derivation III.
11, ix, 1912.

PLATE II.—Electro-cardiograms from Case III. In Fig. 4 the tension of the string was adjusted so as to give a deflexion of 1·5 cm. for 1 millivolt. In the remaining records the tension was the same as in the records in Plate I. The time record is 28·57 per second.

of auricular beats. The auricular flutter was not arrested by pressure on the right vagus.

The auricular flutter in this case differs from that in the three former cases in not being continuous, but, on the contrary, intermittent; and it also differs from the flutter in the first two cases in the fact that the auricular deflexions are not diphasic, but consist of an upward deflexion succeeded by a fall to the base line. A comparison of the electro-cardiograms taken in May 1912 when the auricles were fluttering, with those obtained more recently when the heart was beating quietly and rhythmically, shows that the auricular deflexions were of the same form when the auricles were beating rapidly as when the beats were slow.

In the preceding pages records are given of four cases in whom electro-cardiographic proof was obtained of a quick rhythmic flutter of the auricles. In the first case, with complete auriculo-ventricular dissociation and with an infrequent ventricular rate, the auricular rate was usually about 270. The lowest auricular rate recorded in this case was 246·77, and the highest was 300·0 per minute. In the second case the auricular rate varied from 268·4 to 283·0 per minute, while the initial ventricular rate was half that of the auricles. In the third case the auricular and ventricular rates were 320 and 160 per minute respectively. In the fourth case a series of auricular beats at a rate of 256 to 270 were recorded. In the second and third cases rhythmic ventricular beats at rates of about 140 and 160 respectively were recorded, and they were associated with a ventricular venous pulse in the neck, and in both these cases the rhythmic auricular flutter was subsequently replaced by auricular fibrillation.

In several other patients who have come under my observation the clinical features have resembled those of the Cases II. and III. recorded above. In these patients the rate of the ventricles likewise became greatly accelerated, and yet their rhythm remained regular. In some of these cases the venous pulse could be recorded, and it was of the ventricular variety. When the ventricles were beating rhythmically at a quick rate the auricles were probably in flutter. This supposition is strengthened by the fact that supra-ventricular extrasystoles had been known to occur in some of these patients, and that in some instances auricular fibrillation subsequently supervened, as occurred in Cases II. and III. Brief reference may be made to three of these cases.

CASE V.—Male, aged 19, under the care of Mr. Cathcart in the Royal Infirmary. Records were taken before and during an operation

for osteomyelitis of the femur. Twenty-five minutes before the anæsthetic was given the auricles and ventricles were beating rhythmically at a rate of 81 per minute. Seventeen minutes after the commencement of administration of chloroform they were beating rhythmically at a rate of 75 per minute. Thirteen minutes later (1.33 P.M.) the pulse was markedly hyperdierotic, alternating, and its rate was 166. At 1.34 and 1.35 the rates were 194 and 176 respectively; the rhythm was still regular, and alternation was pronounced. At 1.36 the rate of the pulse had risen to 227 to 230·7 per minute; it was still rhythmic and alternating. The jugulo-carotid tracing presented a continuous series of large waves at a rate of 454 per minute. The auricles were probably in flutter. The rhythmic tachycardia persisted at about the same rate for three minutes. The patient then became cyanosed, the administra-

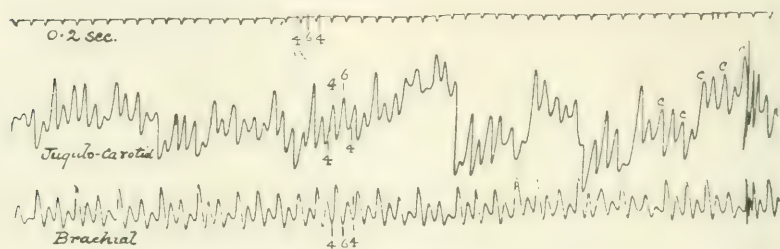


FIG. 7, Case V.—The arterial pulse is rhythmic and alternating with a rate of 225 per minute.

tion of the anæsthetic was stopped, and artificial respiration was performed. At 1.40 the pulse, which had been alternating and rhythmic, became wholly irregular. The pulse periods, estimated from the tracing, were 0·32, 0·30, 0·52, 0·56, 0·35, 0·40, 0·38, 0·30, 0·40, 0·44 sec. At that time the auricular flutter had apparently passed into fibrillation. Two minutes later, however, the auricles and ventricles had resumed their rhythmic action at a rate of 125 per minute, and this condition lasted until the record ceased.

CASE VI.—Mrs. H., aged 41, suffering from exophthalmic goitre. She had a pulse-rate of 100 per minute, and presented numerous supra-ventricular extrasystoles which were probably "auricular" and not "nodal" in origin. About three weeks later the extrasystolic arrhythmia was replaced by a rhythmic pulse at a rate of 120 per minute. On the following morning the auricles were fibrillating, the arterial pulse was wholly irregular at a rate of 182 per minute, and the patient died the same evening. The auricular muscle presented marked degenerative and inflammatory changes.

CASE VII.—Male, aged 60, complaining of dyspnoea and dropsy.

He presented a mitral systolic murmur, the arteries were thick, and the systolic blood-pressure was 275 mm. Hg. The arterial pulse was frequent (131 per minute), rhythmic, and alternating. The venous pulse was of the ventricular form. There is a remarkable similarity

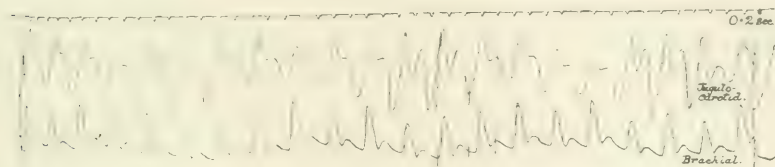


FIG. 8. Case VII. The arterial pulse is rhythmic and alternating with a rate of 131 per minute. The jugular pulse is of the ventricular form.

between the essential characters of this tracing and those of Fig. 1 from Case II., in whom auricular flutter was demonstrated by means of the string galvanometer, and it is probable, therefore, that in Case VII. the auricles were likewise in flutter. In the absence of electro-cardiograms, however, we cannot be certain regarding the exact nature of the auricular action.

In none of the last three cases was it possible to obtain electro-cardiograms. The complete proof that the auricles were in flutter is therefore lacking. But these cases have certain important features in common with those in whom the auricles were undoubtedly fluttering, namely (1) a quick, rhythmic action of the ventricles which was associated (in Cases V. and VII.) with a ventricular venous pulse, and (2) the subsequent onset of auricular fibrillation (Cases V. and VI.). The similarity of these cases with those in which the auricles were proved to be in flutter renders it probable that in the former the rhythmic ventricular tachycardia was associated with auricular flutter.

Auricular flutter is apparently a not infrequent disorder. It is true that only few cases have been recorded hitherto, but it is more than probable that many cases have not been recognised. An analysis of the cases that I have recorded in this paper, and of those reported by other writers, indicates that in some instances a rhythmic ventricular tachycardia is undoubtedly due to auricular flutter, and it may confidently be expected that further cases will be reported.

The condition has been found in patients whose ages have ranged from 21 to 72. The majority of the cases were males. In nearly all the recorded cases evidence of cardiac enfeeblement is stated to have existed, and more than half of the cases presented signs of mitral disease. Auricular flutter may arise, however, in

acute or chronic degeneration of the auricular muscle, or with acute toxæmia (chloroform) apart from valvular disease. One of my cases (No. II.) gave a history of syphilis, and in another (No. I.) a positive Wassermann reaction was obtained. Probably in all cases the disorder owes its origin to some abnormal condition of the auricular musculature. The exact nature of the lesion is still to a large extent a matter of speculation. In the case recorded by Dr. Gibson¹ the walls of the auricles, and of the ventricles in general, "were perfectly healthy, save for a slight increase of the fibrous tissue close to the epicardium, obviously produced by the pericarditis which had led to obliteration of the sac." But in that case the auriculo-ventricular bundle was unduly fibrous. The vagus nerves were absolutely healthy in every respect. In Case III. of my series there was recent fibrinous pericarditis near the surface of the right auricle. The mitral orifice was greatly constricted, and the mitral cusps were thickened and calcified; the coronary arteries were markedly atheromatous. But the muscle both of the auricles and of the ventricles presented only a moderate degree of chronic interstitial myocarditis. The sino-auricular node and the auriculo-ventricular bundle system have not yet been examined. It is evident, however, that auricular flutter is not necessarily associated with a widespread myocarditis of the auricular musculature. Moreover, all the clinical and experimental evidence leads to the conclusion that auricular flutter may be due to a focal lesion, and not to a diffuse one such as may be observed in cases of persistent auricular fibrillation. We know that after a paroxysm of flutter has passed off, and the auricles and ventricles have resumed their physiological rhythm, the patient may quickly lose all his distressing symptoms. Further, we know from the evidence afforded by electro-cardiograms that in any one case all the rapid rhythmic auricular beats originate at one site in the auricular wall, and Lewis holds that when the auricular deflexions are of abnormal form, the site in question is not the normal pace-maker—the sino-auricular node. Rothberger and Winterberg,¹⁵ indeed, have demonstrated that the auricular deflexion is inverted when, under the influence of stimulation of the left accelerator, the left auricle begins to contract before the right. In two of my cases the auricular deflexions were of abnormal form in that they were diphasic. Einthoven² has recorded similar deflexions in the dog during vagus stimulation. But the diphasic curve of the fluttering auricles cannot be ascribed to vagus stimulation, for we know that in three of my cases I, II.,

and IV., and in every other similar case in which vagus pressure has been recorded, the auricular flutter was not controlled by the vagus. Cohn¹ has therefore suggested that flutter may be due either to the vagus influence failing to reach the sino-auricular node, or to failure on the part of the node to respond to the vagus, and that in either case an ectopic area of stimulus production has usurped the function of the sino-auricular node.

In this connection it is important to recall the fact that auricular flutter, as observed in man, corresponds closely to the condition in the lower mammalian heart so well described by MacWilliam.¹¹ By faradic stimulation of the right or left auricular appendix, he says, "the auricles are thrown into a state of rapid fluttering action . . . meanwhile the ventricles beat rapidly: much more rapidly than usual, though their action is not nearly so rapid as that of the auricles. . . . All the auricular contractions indeed are not transmitted to the ventricles: often not more than one-half or even less are transmitted." A rapid rhythmic auricular action on the application of stimuli of moderate intensity to the auricular appendix has also been described by Hirschfelder,¹² who has drawn attention to the similarity of this experimental tachycardia to paroxysmal tachycardia in man. As auricular flutter in the lower mammalian heart can be induced by stimulation of a localised area of the auricular wall, it is probable that auricular flutter in man is likewise due to increased excitability of some or other portion of the auricular wall. Whether this change is due to a localised inflammatory lesion, to abolition of vagus control, to accelerator stimulation, or to two or more of these factors acting in combination, we do not know. In view of the researches of Rothberger and Winterberg¹³ on the action of the accelerator nerves, however, we must admit that accelerator stimulation may perhaps play an important part in the etiology of auricular flutter.

Symptoms.—In considering the symptomatology of auricular flutter, it is convenient to recognise four groups of cases—

1. Those in whom other signs of cardiac disorder may, or may not, be detected, but in whom the symptoms—palpitation, vertigo, precordial pain, and dyspnoea—can be ascribed to the auricular flutter and consequent acceleration of the ventricular rate. If, as is often the case, the ventricular rate is one-half that of the fluttering auricles, the arterial pulse is greatly accelerated—130 to 162 per minute, rhythmic, of small volume, and often alternating. According to Mackenzie, there may be paroxysms in which the

pulse attains a rate of 290 to 300 per minute. The jugular veins may pulsate freely, and tracings from them show a rhythmic ventricular venous pulse.

If the ratio of auricular to ventricular systole varies from 2:1 to 3:1, the apical impulse and the arterial pulse are not rhythmic (Figs. 2 and 3), and their rate will probably not exceed 120 or 128 per minute. The arterial pulse may be markedly alternating. The characteristic feature in tracings recorded from the jugular veins is the series of quick rhythmic waves, often of considerable size, at a rate of about 240 to 320 per minute. In cases of this group the symptoms may disappear quickly, soon after the auricles revert to their physiological rhythm; or the distressing symptoms may subside even although the flutter persists.

In some of these cases of auricular flutter the diagnosis may be uncertain even after an analysis of venous and arterial tracings, but in most instances the tracings are so characteristic as to establish the diagnosis beyond doubt. In other instances the true nature of the disorder is not recognised until it is revealed by electro-cardiograms. Every case of rhythmic ventricular tachycardia is not due to auricular flutter. Dr. D. Halliday Croom has shown me electro-cardiograms, recorded by him in this laboratory, from patients in whom the rate of the rhythmic ventricular beats exceeded 140 or even 150, and in whom the auricles were not fluttering.*

2. Cases with a history of old-standing cardiac disease, with cyanosis, dyspnoea, and dropsy, and in whom auricular flutter eventually supervenes. With the onset of the flutter the patient's condition becomes decidedly worse, much in the same manner as so often occurs at the onset of auricular fibrillation. The rate and rhythm of the ventricles and of the arterial pulse depend not only on the auricular rate, but also on the ratio of auricular to ventricular systole, as already described.

3. Cases with partial auriculo-ventricular heart-block—the cases described by Gibson⁴ and by Hertz and Goodhart⁵ fall into this group. The ventricular rate is comparatively infrequent (40 to 80 per minute); the beats are usually irregular and may be coupled.

4. In auricular flutter with complete auriculo-ventricular

* Dr. John Cowan, to whom I express my grateful thanks for much kind help and criticism, describes (*Glasgow Med. Journ.*, 1912, lxxvii. 109) a nodal rhythm in which the auricles and ventricles beat regularly, and the a-c interval is short; the rate may exceed even 200 per minute.

dissociation (Case I. of my series) the rate and rhythm of the ventricles are not influenced by the fluttering auricles.

The immediate prognosis is good in cases of auricular flutter without symptoms or signs of organic disease of the heart, and without cardiac enfeeblement. An attack of flutter, with an abrupt onset and cessation, may be regarded as a form of paroxysmal tachycardia. After the heart has regained its physiological rhythm the patient makes a speedy recovery, and may remain free from further attacks for a long period. In these cases the whole clinical picture suggests that the attack may be due to transient loss of vagus control combined with increase of accelerator influence.

When auricular flutter ensues late in the course of an old-standing myocardial or valvular affection, and is associated with signs of grave enfeeblement of the ventricles, the prognosis is unfavourable. The flutter may be the immediate precursor of persistent fibrillation of the auricles. In cases of complete heart-block, however, the development of auricular flutter is of little prognostic significance. In Case I. of my series the flutter has persisted almost constantly for more than seven years.

Treatment.—At the outset the patient should be kept lying in bed; all unnecessary exertion or strain should be avoided. Complete rest is of much benefit. At the same time attention should be directed to shielding the patient as far as possible from all influences, such as worry and excitement, that are likely to stimulate the accelerator mechanism of the heart. In one of Mackenzie's cases the prolonged administration of ammonium bromide, in 20-grain doses three times daily, was helpful in promoting sleep and in checking the more serious paroxysms of ventricular tachycardia.

The drugs that act most beneficially, however, are digitalis and strophanthus. In Case 37 of Mackenzie's series the auricles, under the influence of digitalis, passed from flutter into fibrillation, and thereafter regained their physiological rhythm. In Case 38 of Mackenzie's series digitalis was likewise administered; the rhythmic ventricular tachycardia at a rate of 150 per minute first became slower and irregular; five days after the digitalis was stopped the auricles ceased to fibrillate, and resumed a physiological rhythm of 72 beats per minute. The patient made an excellent recovery. In two of the cases recorded by Lewis a similar sequence of events was observed. In Case I. of my series half an ounce of infusion of digitalis was administered thrice daily

for a short time some years ago, but the drug did not influence the auricular flutter. In view of the admirable results recorded by Mackenzie, it was considered advisable to try to restore the normal rhythm in the two cases (Nos. II. and III.) that were under my care recently. In Case II. digitalis relieved the patient of all his distressing symptoms and lowered the ventricular rate from 140 to 72-68 per minute. Meanwhile the auricles continued in flutter, the fall in the ventricular rate being due to the substitution of a 4:1 for a 2:1 rhythm. After the patient had taken about 24 drachms of digitalis tincture the auricles passed into fibrillation and the rate of the pulse fell to 62 per minute. The patient remained in fairly good health for about three weeks when, the ventricular rate having become more frequent, and the auricular fibrillation still persisting, the digitalis was resumed. In Case III. the patient had been taking 10 minims of tincture of digitalis thrice daily for eight days before the onset of auricular flutter. An intravenous injection of 0.001 gramme of strophanthin was given in the evening, and on the following morning the patient was decidedly better: the auricles were fibrillating, and the ventricles were beating more slowly and irregularly. On the succeeding day the auricles and ventricles had regained their physiological rhythm, with a rate of 90 per minute. This rhythm was maintained until the seventh day, when the patient died.

Both digitalis and strophanthus must be regarded as useful in cases of auricular flutter. Considerable doses may be required to control the ventricles, and in an urgent case an intravenous injection of strophanthin may be administered with benefit. The administration of one or other drug by the mouth should be continued steadily until the ventricular rate has fallen to about the normal. The auricles may then be in fibrillation. Following the advice given me by Mackenzie, I would then reduce the dose of the drug to the smallest amount that restrains the ventricular action satisfactorily and that keeps the patient free from symptoms. In future cases I would not stop the drug entirely, except perhaps for a few days at a time, until the physiological rhythm was restored.

The beneficial action of digitalis and strophanthus in cases of auricular fibrillation is doubtless due to their action on the auricular muscle and on the auriculo-ventricular bundle. The action on the bundle is manifested by the halving of the ventricular rate, with an As:Vs ratio of 4:1 instead of 2:1. The change from auricular flutter to fibrillation, under the influence

of digitalis or strophanthus, cannot be ascribed to the drugs depressing the auricular excitability. But these drugs, whether by stimulating the vagus, or by acting directly on the muscle fibres, can depress auricular conductivity, and thus promote fibrillar contraction of auricular muscle fibres, the excitability of which is excessive. When the auricles pass from flutter into fibrillation, it seems likely that the stimuli transmitted to the ventricles will become not merely irregular, but also feebler, and therefore more readily blocked in their transmission along the auriculo-ventricular bundle system. The ventricular beats will consequently become slower and stronger, although irregular in rhythm. The circulation becoming more efficient, the patient is relieved of his symptoms, and we look forward with hope, or even confidence, to the day when the nervous disorder, the local inflammation, or the other unknown factor that excited the flutter, will subside, and when the physiological action of the auricles will be restored.

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PERFORATED DUODENAL ULCER.*

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THE following remarks are based on a series of 27 cases of perforated duodenal ulcer which I have been called on to treat during the last few years, some of them in the wards of which I have charge in Leith Hospital, the remainder in doing emergency work as an assistant-surgeon in the Royal Infirmary. I have to thank my chiefs in the Infirmary for the opportunity of treating some of the cases which occurred in their services.

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The cases are of interest because they illustrate well the features of a serious emergency frequently met with in hospital and general practice, and because I have been able to follow the after-results in a considerable number of the cases in an endeavour to ascertain whether the treatment carried out has been effective in preventing recurrence of the symptoms associated with duodenal ulcer before perforation occurred, as well as in tiding the patients over the illness associated directly with perforation itself.

Age and Sex Incidence.—The ages of the patients varied from 14 to 69 years. Two of them were between 10 and 20, three between 20 and 30, five between 30 and 40, nine between 40 and 50, six between 50 and 60, and two between 60 and 70. There was only one female patient in the series, a woman of 40. These figures call for no special comment; they illustrate the well-known fact that while duodenal ulcer is most often met with in men between 30 and 50 or 55, it may occur quite early or comparatively late in life.

Histories of Patients before Perforation.—Of more interest are the personal histories of the patients before perforation occurred. So much stress has recently been laid, notably by Moynihan, on the form of dyspepsia said usually to be associated with duodenal ulcer, that we are apt to forget the fact that in some cases duodenal ulcer may cause little or no digestive disturbance at all. An analysis of the histories given by the 27 patients in this series shows that they fall naturally into three groups—those who gave a history of marked chronic dyspepsia; those who gave a history of occasional slight digestive disturbance; and those who gave a history of apparently perfect health until perforation occurred.

Seventeen belonged to the first group, and gave a history of aggravated chronic dyspepsia, which had existed continuously or with intermissions for months or years, in some cases so severe that the patients carried on their occupations with difficulty. They suffered from epigastric pain, tending in most cases, but not in all, to come on $1\frac{1}{2}$ to 3 hours after food had been taken; were usually much troubled with flatulence, rarely by vomiting. In only one case was there a history of melena, and in it the blood passed was found on examination to be bright red and therefore not to come from the duodenum. It is noteworthy that in a few of the cases the pain complained of came on quite soon after the ingestion of food. On the other hand, pain coming on some hours after food—hunger-pain as it has been termed—is not necessarily associated with ulcer in the duodenum. Not long ago I had

occasion to operate on a man of 45 for symptoms of perforation who gave a typical history of hunger-pain. He was in the habit of breakfasting at 8 A.M., and his pain came on about midday, to be at once relieved when he took his dinner at one o'clock. It returned again in the afternoon for a time and often troubled him at night. He was in the habit of taking food to relieve it. On opening his abdomen the duodenum was seen to be intact, and he was found to have a perforation in a large indurated ulcer situated high up on the lesser curvature of the stomach, near the oesophagus. He made a good recovery, but after remaining well for a few months began to suffer again from painful dyspepsia. Gastro-enterostomy was not done in his case.

Five patients belonged to the second group, *i.e.* those who had suffered occasionally from slight dyspepsia. When first examined, these patients did not volunteer a history of dyspepsia, but in answer to leading questions one was able to elicit from them that they occasionally suffered from flatulence and discomfort in the epigastric region. None of them had ever had occasion to seek advice for their symptoms, and it was evident that these had been trivial in nature and in no way characteristic of duodenal ulcer.

The third group consisted of four patients who were apparently in perfect health when perforation occurred and who had never suffered from dyspepsia at all. In order to be sure that this statement is accurate I have recently seen and carefully questioned these patients again, and there is no doubt of its correctness.

Out of 27 cases then in which ulcer was present and went on to perforation, ten had either no previous symptoms at all or such slight disturbance that a diagnosis of ulcer could not reasonably have been made. The lesson one has learnt from a consideration of these facts is, that when confronted with a case presenting symptoms suggestive of perforation, a previous history of dyspepsia is suggestive and helpful in making a diagnosis, but, and this is the important point, a negative history is of no value in enabling one to exclude the possibility of perforation. It is quite certain that duodenal ulcer may exist for some time at least without giving rise to any characteristic symptoms. This fact has often been emphasised before, and cases have been recorded by Professor Caird, Mr. Miles, Mr. Mitchell of Belfast and others, but its significance is sometimes, I think, apt to be lost sight of by those who maintain that it is possible to diagnose the presence, or the cure by medicinal and dietetic measures, of duodenal ulcer from a patient's symptoms. In this connection I should like to quote

from the second edition of Moynihan's book on *Duodenal Ulcer*. On page 225, in speaking of the differential diagnosis of perforated duodenal ulcer, he says: "In my own experience a perfectly clear account of the characteristic symptoms of duodenal ulcer can usually be obtained. It is true that in some of the recorded cases it is said that there were no previous symptoms, or that 'only a little indigestion' had been noticed. Such statements require close examination. In the light of the more accurate knowledge we now possess as to the characteristic manifestations of duodenal ulcer they cannot be accepted. We know that in all cases, other than the acute toxic cases, it is a chronic ulcer of the duodenum which perforates, and no chronic ulcer of the duodenum exists without betraying its presence by symptoms which to those cognisant of them are of the clearest significance." The great majority, if not all, of my cases have been treated since Moynihan began to direct attention to the frequency of duodenal ulcer, and my patients have been examined and treated, to use his expression, in the light of the more accurate knowledge we now possess of the characteristic manifestations of duodenal ulcer, which we owe so largely to his work and teaching. In dealing with these cases of perforated ulcer I have learnt that too much reliance must not be placed on a patient's previous history in making a diagnosis, and it seems to me that a mistaken impression of the clinical features of duodenal ulcer will prevail unless it is recognised that in a certain proportion of cases characteristic symptoms are absent. Twenty-seven cases make a small number to generalise from, and it may be said that it is hardly justifiable to make any deductions from such limited evidence. At the same time these cases are of some value in this respect, for in each case the existence of an ulcer was definitely proved by the occurrence of perforation, and one feels that the great variations in the symptoms present before perforation occurred show how dangerous it may be to make dogmatic statements as to the presence or absence of an ulcer in any given case of dyspepsia.

Signs and Symptoms of Perforation.—As far as one can tell, there is no premonitory sign or symptom which really indicates that perforation is imminent, and no direct cause for its occurrence. In two of my cases it was perhaps associated with violent physical exertion on the part of the patients, in two cases it occurred while the patients were lying quietly in bed, and in the remainder it took place while the patients were up and going about their ordinary avocation. In none of the cases, however, could one

elicit any history of unusual symptoms present during the days or hours when ulceration must have been extending through the peritoneal coat of the duodenum. Attention has been directed by others to the occurrence of so-called premonitory symptoms, but on examination it seems to me that these symptoms rarely, if ever, differ in character from those experienced by the patients at periods remote from the occurrence of perforation, and I have not been able to find in my own records or those of others any symptom so differing in character or intensity from those previously experienced as to justify its being termed a symptom premonitory of perforation.

The signs and symptoms following perforation in typical cases are well known and need not be detailed. In such cases the agonising pain, accompanied by general abdominal tenderness and muscular resistance, most marked in the upper right quadrant of the abdomen, make the diagnosis of perforation peritonitis easy. By the time the patients come under observation in hospital, however, the clinical picture is not always a typical one. By that time the initial shock has in the majority of cases passed off and the period of reaction has set in, to which Mr. Miles specially directed attention in the paper which he read to the Society some years ago on this subject. The intensity of the pain has often lessened—in some cases spontaneously, in others under the influence of morphia or other sedative which has been administered to relieve it. While in most cases the amount of improvement is not sufficient to obscure the diagnosis, cases of difficulty do arise, and in the cases under review difficulty was caused in one group of 3 cases by the patients referring the pain chiefly to the right iliac fossa, and by the maximum tenderness and resistance being found below the umbilicus on the right side. In such cases, which are usually regarded as cases of appendicitis, one's suspicions are roused by the widespread muscular resistance which is present early in the illness, and by the fact that the temperature and pulse-rate are not markedly, if at all, raised, while the addition of a history of aggravated dyspepsia inclines one still more to hesitate between the possibility of perforation and an attack of appendicitis. If, however, the greatest tenderness and resistance are definitely in the right iliac region, it may be, I believe, impossible to differentiate with certainty between the two conditions before operating. In such circumstances it has been my custom to open the abdomen through the right rectus muscle just below the umbilicus, explore the appendix region first, and then extend

the incision high enough to get at the stomach and duodenum on finding that the appendix is not at fault.

In 4 cases special difficulty arose, because by the time the patients came under my observation such marked improvement had taken place that I was doubtful of the presence of a serious lesion at all. The patients were men aged 23, 31, 51, and 69 years respectively. Two of them gave a history suggesting the presence of old-standing ulcer, the others did not. All had been seized with violent abdominal pain some hours before admission to hospital, and had been sent in as urgently requiring treatment. When I saw them their pain had almost gone, the respiratory movements of the abdominal wall were free, and there was no *general* tenderness or muscular resistance. The only sign of trouble present was slight tenderness and moderate muscular resistance limited to the upper half of the right rectus muscle.

In these cases the fact that the initial pain had been of great severity, leading those who first saw them to believe that some serious lesion was present, coupled in two of them with a history suggesting ulcer, induced me to operate. On opening the abdomen a perforated ulcer was found in each case, and the explanation of the marked improvement in the patients' symptoms was found to be that the leakage from the perforations had been very slight, for in one case, that of a man aged 69, the duodenum had become glued to the liver and further leakage thereby prevented, while in the other cases the perforation was extremely small, and the oedematous swelling of the peritoneum, along with the lymphic exudate thrown out, had practically blocked the openings and prevented further leakage, as long as the parts were allowed to remain at rest. Had these patients not been operated on, the local peritonitis might have spread, might have given rise to a localised abscess, or have subsided, with the formation of adhesions and a cicatrix as the result of the inflammatory reaction set up, a condition certain to have aggravated the trouble already present. In all four cases the ulcer was closed, inverted, and gastro-enterostomy done. Three of the patients are now well and free from digestive disturbance, and the fourth, who was operated on only a week ago, is well on the way to recovery.

In cases seen at a late stage in their illness two, three, or more days after perforation, when advanced general peritonitis is present, a previous history suggesting ulcer may be the only clue to the origin of the peritonitis, and in such cases is of great value. Where it is absent, as in the case of a boy of 14 whom I first saw

on the third day of his illness, the diagnosis can only be a matter of guess-work till the abdomen has been opened.

Operative Findings and Treatment.—The great majority of my patients have been muscular males, with firmly contracted abdominal muscles. In operating on such cases it is important to have the muscles thoroughly relaxed in order to obtain ready access to the duodenum, and the anaesthesia must occasionally be as deep as is consistent with safety. In some of my patients morphia had been given before I saw them; in a few I gave morphia with scopolamine before operating, to relieve pain and spasm, with the idea of making the anaesthetist's task easier. It has seemed to me that least trouble resulted in cases where chloroform was used alone, at least during the difficult part of the operation or until the end of an operation was approaching, when ether was occasionally substituted. The previous use of morphia has only proved a complication. The effect of a given dose is difficult to gauge, and it often seems to diminish the activity of the respiratory centre in an embarrassing and uncertain way. For this reason I much prefer that morphia or other sedative should not be given, at any rate with a view of making the anaesthesia easier. Chloroform is the anaesthetic which gets the patient under quickly and quietly, and which produces the desired muscular relaxation when properly used, and I have never had occasion to regret its use.

Site and Size of Perforation.—In all cases the perforation has been found on the anterior aspect of the duodenum, within an inch or an inch and a half of the pylorus, sometimes towards the upper limit of the anterior surface, more often towards the middle of it. In size the lesions have varied from a minute hole emitting bubbles of gas and small drops of fluid when handled, to a perforation large enough to admit the tip of one's thumb. The great majority have been rounded or ovoid in shape, the longest diameter ranging from 2 to 6 millimetres in length. The size has not been proportionate to the length of time elapsing between the time of perforation and its discovery at operation, for relatively large perforations have been found within a few hours of the onset of symptoms, while small ones have been found in cases operated on late in the course of their illness. The wall of the duodenum has usually been found oedematous and friable, making closure by stitching difficult owing to the tendency of the stitches to cut through when tied, especially if a fine thread was used. Except in one case where perforation followed some hours after a bismuth meal, and in which particles of bismuth were found scattered about the right

kidney pouch, solid material has not been found in the peritoneal cavity. Accurate estimation of the amount of leakage has therefore been impossible, for the copious peritoneal exudate which is rapidly poured out mixes with the escaping gastric and intestinal juice, and unless the latter is mixed with bile or food there is nothing by which one can recognise its presence. It is so rare to find obvious food material that one is inclined to believe that the actual amount of leakage is in most cases slight. Probably peristalsis is arrested after perforation occurs. In two cases, both fatal, the fluid in the peritoneal cavity was markedly bile stained. One of these cases was that of a man who had been ill for three days before admission to hospital without having been seen by a doctor, and who had a large perforation in an old-standing ulcer. The second was that of a patient who vomited persistently from the onset of his illness till his admission to hospital for operation 18 hours later.

Closure of Perforation.—After locating the perforation the parts are brought to the surface as well as possible and the pyloric end of the stomach given to an assistant to hold, so that the perforation is well exposed. Any excess of fluid which obscures the field by welling up from below with each respiratory movement is rapidly swabbed away and gauze packs placed to catch anything that may leak from the ulcer before it is closed. The stomach must be firmly but carefully held, in such a way as to avoid enlargement of the perforation by tearing, while the ulcer is being dealt with. It is my custom to close the ulcer with interrupted stitches of thick catgut inserted at right angles to the long axis of the pyloro-duodenal junction. Excision of the ulcer is unnecessary, and complicates the closure. The wall of the duodenum is often very friable, and a thick thread is preferable, as being less liable to tear out. On the other hand it is undesirable to use silk, which remains as an irritating foreign body. No. 3 or No. 2 catgut, not chromicised, makes the best suture material. One or two stitches are passed through the whole thickness of the duodenal wall, so that when tied they will occlude the perforation. Three or four Lembert stitches of the same material are then passed across and on each side of the ulcer, so as to invert it thoroughly and efficiently shut off the perforation. Finally, a tag of the gastro-hepatic omentum can readily be stitched over the line of suture if it seems desirable to do so. Effective closure of the perforation is essential. If the stitches tear out and further leakage occurs, a troublesome and dangerous local infection with the formation of a fistula may follow. It is therefore important to pass the Lembert

stitches deeply into the intestinal wall so that they take a good hold, and to infold the pyloro-duodenal region well beyond the ulcer so as to secure a broad apposition of peritoneal surfaces. In a few of my earlier cases I used fine silk to close the perforation, such as one uses for intestinal work generally, and in two cases found afterwards that the stitches had cut out, allowing the perforations to reopen. In two cases I have had the opportunity of examining the closure effected by catgut stitching after death—in one 7 days, in the other a few hours, after operation—and in both cases it was complete and satisfactory in every way.

In cases where the patient is desperately ill the operation is rapidly finished after closing the perforation by swabbing out the excess of fluid in the peritoneum, inserting a large tube into the pouch of Douglas, and closing the upper wound. Where, however, the patient's condition justifies it, it seems best to do a posterior gastro-enterostomy before finishing the operation. Closure of the perforation with or without excision of the ulcer does nothing to alter the conditions which have given rise to the ulcer, nothing, in other words, to prevent relapse or recurrence of the symptoms which the patients had before perforation occurred. The narrowing of the duodenum, brought about by infolding the ulcer, especially when it is a large one, must rather tend to prevent the healing of the old ulcer or to increase the liability to the formation of a new one if the old one heals. In addition, the puckering and irritation due to the stitching probably interfere with the proper action of the pylorus, especially during the days immediately following the operation, and if the stomach contents have to pass along the duodenum, the healing of the stitched ulcer will certainly not be facilitated. In a few cases the duodenum and pylorus are so much narrowed by the stitches necessary to close and infold the ulcer that one is forced to do a gastro-enterostomy immediately to prevent obstruction, and it was in cases of this type that one first learned how well the operation is tolerated, and how beneficial it appears to be in promoting the patients' comfort during recovery. Presumably it acts as a drainage opening for the stomach, allowing complete or partial rest for the pylorus and ulcer, and thereby promoting healing and lessening the tendency to vomiting.

Gastro-enterostomy, it may be urged, is not an indifferent operation, and the mere fact that it helps recovery would not justify its addition to an operation for perforated duodenal ulcer, unless it is to be of real permanent benefit to the patient. As far as we know at present it is the best remedy for chronic duodenal

ulcer, and the surest means of promoting healing and preventing recurrence in cases where perforation has shown the presence of an ulcer. Why not, then, do it in cases where the patient's condition is good enough? Patients are not likely to submit to its performance later on, after having been through the ordeal of an operation for perforation, except in case of dire necessity, and if it can be safely done it seems reasonable and wise to do it whenever possible at the operation for closure of the perforation. I have done gastro-enterostomy in 17 cases, in addition to closing a perforation: 16 of the patients recovered and are now well, without serious digestive trouble, and the 17th is, I believe, well on the way to recovery. Out of three cases in which I did not do gastro-enterostomy and in which recovery took place, two have now symptoms which indicate that they have still an ulcer in the duodenum, while the third is free from dyspepsia, as he was until perforation occurred. It is a common, in fact I believe the usual, experience to find that in cases of perforated gastric or duodenal ulcer the patients are relieved for a time of all symptoms after mere closure of the perforation, with infolding of the ulcer. The two cases of duodenal perforation referred to in which recurrence of symptoms has taken place were well for a time after operation, and I have knowledge of four cases of perforated gastric ulcer in which the patients were likewise perfectly well for a time, only to relapse later on and suffer as much as before. None of these patients are willing to submit to a second abdominal operation. That relapse should occur, especially in cases of duodenal ulcer, seems not only possible but actually what one would expect, and for this and the other reasons given above it seems advisable to do gastro-enterostomy in cases of perforation of duodenal ulcer, and probably in cases of gastric ulcer, the closure of which narrows the pyloric region of the stomach. After doing gastro-enterostomy the excess of fluid which collects chiefly in the right kidney pouch and the pelvis should be gently swabbed out. In a few of the earlier cases I washed out the peritoneal cavity, but I have come to believe, from watching my own cases and others which I have had the opportunity of seeing, that flushing the peritoneum with saline is not only unnecessary but probably harmful. The fluid which collects in cases of perforated ulcer is a peritoneal exudate, usually aseptic in the earlier stages of a case, and there is no necessity to remove it completely. If a suprapubic drain is inserted, the fluid which the peritoneum continues to pour out for about 24 hours will escape freely enough to prevent any dangerous collec-

tion of it, and the main operation wound may be completely closed.

After-Treatment.—To relieve the pain following the operation and give the rest which is necessary after the severe strain to which the patients have been subjected, a dose of morphine or heroin may be given when consciousness is regained. It should be large enough to ensure sleep for some hours. If a single good dose is given it does not need to be repeated, and does not appear to be in any way harmful. Thirst may be relieved by allowing the patients to drink water freely from the first. Only if vomiting is persistent, preventing the administration of fluid by the mouth, is it necessary to give saline solution by the rectum or intravenously. Fluid nourishment in gradually increasing quantities may be given after the first 24 hours, and in a few days soft foods, such as cornflour, arrowroot, milk puddings, etc., may be allowed, to be soon followed by easily masticated and digested more solid food. Before allowing a return to a full ordinary diet it is well to see that a patient's teeth are put in proper condition, to enable him to masticate efficiently.

Results.—Two of the 27 cases were admitted to hospital moribund and died a few hours later—one a lad of 21, 26 hours after perforation, the other a man of 54, three days after the first onset of symptoms. Neither of these patients responded in the least to the measures adopted to stimulate them, and in neither case could operative treatment have been attempted with any prospect of success. The remaining 25 patients were operated on as soon as possible after they were seen in hospital. Nineteen of these recovered, and the twentieth is well on the way to recovery. They owe their recovery primarily and mainly to the medical men who sent them into hospital without delay, so that they were all operated on within 24 hours of the onset of symptoms. In three of them no gastro-enterostomy was done, and in two of these, as related above, symptoms indicative of duodenal ulcer appeared after some months of good health following operation. The third in this group, a man of 61, had no dyspepsia before his illness, and has remained well for more than 2½ years since his operation. Of the remaining 16 cases, in all of which gastro-enterostomy was done, two have been lost sight of. The other 14 are, I believe, all well, able for their work, and free from serious digestive trouble. I have either seen these patients recently myself or heard of them from their medical men. A few of them have been operated on within the last few months, the remainder at various intervals up

to $4\frac{1}{2}$ years. So far none of them have shown signs of relapse, and I think that these results justify the treatment adopted.

Five of the patients operated on died—one operated on 18 hours after perforation occurred, in whom the peritoneal cavity was filled with markedly bile-stained viscid fluid and whose condition appeared almost desperate before operation. He died a few hours later from shock. Another operated on within 24 hours of perforation died 10 days later of general peritonitis and broncho-pneumonia. In his case the stitching of the ulcer with silk had given way, and fresh leakage had occurred, causing or aggravating the general peritonitis. The three remaining fatal cases were all operated on more than 24 hours after perforation, two of them more than 48 hours after it had occurred, and in all general peritonitis with its resulting toxæmia and obstruction was the cause of death. In none of these five cases was a gastro-enterostomy done, for their condition appeared too bad to justify the prolongation of the operation necessary for its performance.

Conclusions.—In conclusion the points I should like to emphasise in connection with the 27 cases referred to are as follows:—

1. Duodenal ulcer may be present and go on to perforation without giving rise to characteristic symptoms before perforation.

2. There are no symptoms which may justly be described as premonitory of perforation.

3. When perforation of a duodenal ulcer has occurred, difficulty in diagnosis may arise owing to—(a) the pain being referred to the appendix region; (b) early and marked abatement of the severity of symptoms in cases where leakage from the perforation is limited by early adhesion taking place, or by oedematous swelling of the intestinal wall in cases of very minute perforation.

4. Catgut may safely be used to close and infold the perforated ulcer, and is preferable to silk for this purpose.

5. Gastro-enterostomy should be done at the operation for closing a perforated ulcer when the patient's condition will permit of it, for it promotes the immediate recovery and lessens or abolishes the tendency to recurrence of ulceration.

NITROUS OXIDE AND OXYGEN AS AN ANÆSTHETIC
FOR DENTAL AND SURGICAL PURPOSES.*

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and

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THE object of this paper is to advance the proposition that the mixture of nitrous oxide and oxygen is an anæsthetic worthy of more attention than surgeons and anæsthetists have accorded it in this country, and to describe its administration by means of the simplified apparatus we have devised.

Briefly stated, the advantages claimed for this mixture are that it is of all general anæsthetics that which (1) produces an anæsthesia most closely resembling physiological sleep; (2) produces the least disturbance of the vital functions of respiration, circulation, and alimentation; (3) involves of itself the least risk to the life of the patient. If these claims, which appear to us indisputable, be admitted, the question arises,—Why has it failed to come into general use as a routine anæsthetic in dental and surgical practice? The answer must be,—Because the disadvantages attaching to the apparatus and methods of its administration were such as to discourage the ordinary practitioner and to restrict its employment to the enthusiastic expert.

Sir Frederic Hewitt in 1886 began his valuable series of experimental investigations on the action of this mixture, and the apparatus he subsequently devised for its administration has practically held the field in these islands. But Hewitt himself states that the method is “obviously beyond the reach of most administrators,” and that it “requires a more complicated apparatus and considerable practice to become proficient in its use.” It is, too, a difficult matter to keep the two bags he uses half distended, and to know when to give more and when to give less oxygen. Owing to the fact that he definitely adopted the principle of respiring through valves, whereby the patient’s expirations are returned to the general atmosphere, lengthy administrations required very large quantities of the gases. This meant considerable expense and the use of cylinders of large capacity and great

* Paper read before the Edinburgh Medico-Chirurgical Society, 6th November 1912.

weight. Therefore, while we desire to record our unstinted admiration of Hewitt's labours and of his advocacy of the merits of this mixture, we must definitely state our conviction that the general and extended use of this valuable anæsthetic depends on the adoption of a simple and inexpensive method, which enables the anæsthetist to control with some degree of accuracy the percentage of oxygen in the mixture, and by allowing rebreathing of the bagful of gas and oxygen for definite periods gives us economy of consumption and the advantages attendant on conservation of CO_2 and a moderate rise in the CO_2 content of the blood.

Henderson may or may not be right in saying that a deficiency of CO_2 in the blood is a common cause of syncope and shock under ether and chloroform; it will, however, be admitted that this gas is the stimulant of the respiratory centre, and that the ultimate cessation of respiration attendant on the administration of nitrous oxide through valves is as much acapnic as anoxymic.

While conservation of carbonic acid is to be desired, oxygen starvation must be avoided. Physiology has now elucidated the actions of the two factors in asphyxia. According to Starling and his co-workers, Kaya and Jerusalem, excess of CO_2 acts, so far as the nervous system is concerned, upon the medullary centres only, and mainly upon the respiratory centre, of which it is the natural stimulant. It is also a cardiac stimulant until the percentage of CO_2 in the air respired rises to 12 per cent., when it begins to have a depressant action. Lack of oxygen is a much more serious matter. It affects the whole nervous system, especially the spinal and vaso-motor centres, causing a rapid rise in blood-pressure and eventually convulsions. The heart, depressed from the first, is rapidly overcome by the rising peripheral resistance.

In the light of these facts it is apparent that, armed with a method providing for a sufficient supply of oxygen under due control, we may regard the presence of a slight excess of CO_2 in the air respired with equanimity.

To this conclusion, the correctness of which is now established on a physiological basis, our clinical experience had long since led us, and we felt ourselves on firm ground in adopting the rebreathing principle. One of us (Guy) has long taught and practised the principle in giving nitrous oxide alone, or in mixture or sequence, and has never seen any reason to depart from the position he took up on this matter so far back as 1895.

In America much valuable and important work and research

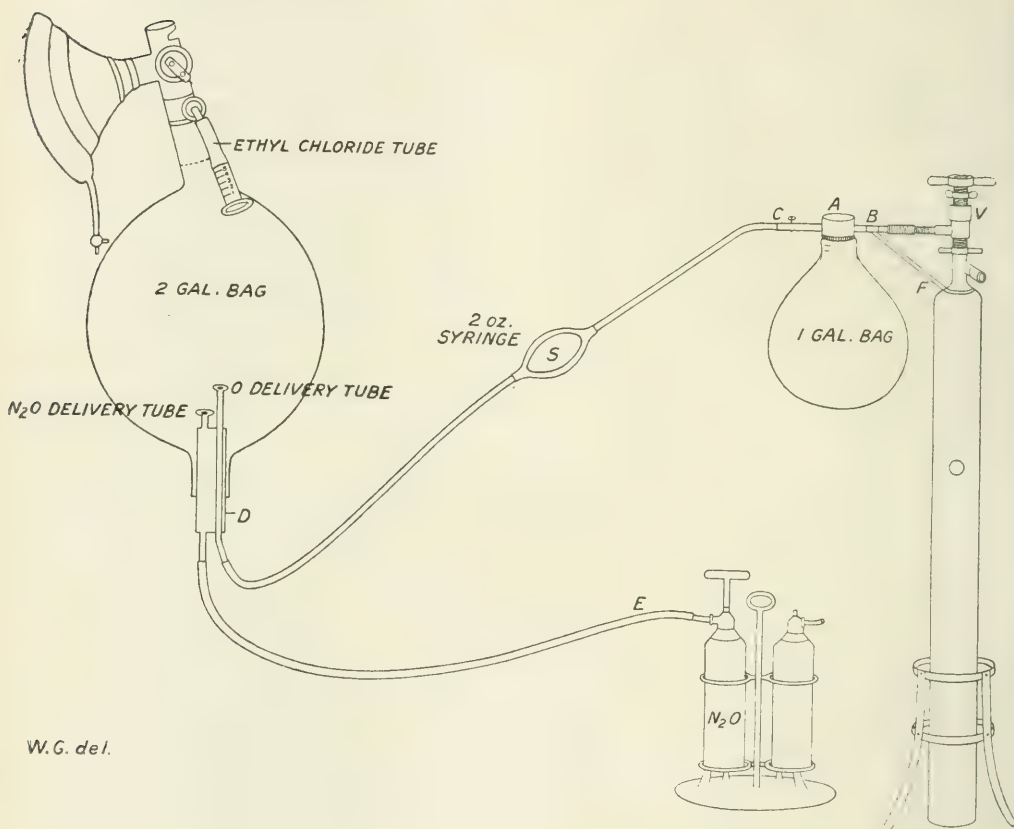
bearing on the administration of gas and oxygen has been carried on during the last few years, and the mixture has been extensively and successfully used, notably by Dr. Gatch and Dr. Teter. Gatch is fully alive to the importance of rebreathing as a factor in the success of the method; indeed its importance seems to be generally recognised by American anaesthetists. In his method, as in ours, the two gases are mixed in one bag and rebreathed until the CO_2 content rises to as high a point as is desirable; the bag is then emptied through the expiratory valve and refilled from the cylinders. The Gatch method does not provide, nor does any other method with which we are acquainted provide, for measuring with any degree of accuracy the amount of oxygen introduced into the bag. While long practice may enable the anaesthetist to dispense with any such arrangement, we cannot but think that it is very helpful to be able to determine how much oxygen is being used, always provided that this does not involve any complicated mechanism which may get out of order, with or without the knowledge of the administrator.

The apparatus we now show was devised by us to meet these requirements.

It may be described as a lineal descendant of the Guy "gas and ethyl chloride" inhaler. The facepiece, Barth 3-way tap, and bag mount, with the side tube for ethyl chloride, are all the same, but we use, instead of the usual one-gallon bag, a two-gallon bag, the distal end of which carries a Y union. One limb of the Y is connected directly by rubber tubing to the nitrous oxide cylinder, to the other limb is attached a ball syringe, the bulb of which is of two-ounce capacity. At each end of the bulb is a rubber valve, so that squeezing the bulb propels its contents in one direction only, that direction being, of course, towards the two-gallon gas bag. The distal end of the ball syringe is connected to a one-gallon bag which is fixed in front of the oxygen cylinder, with which it is connected by a metal tube. In the portable form now shown, two fifty-gallon cylinders of nitrous oxide are fixed on one side of an upright frame, and two cylinders of oxygen of the same size are held on the other side of the frame, but if desired the nitrous oxide can be run from two horizontal cylinders worked by the foot, and the one-gallon bag can be fixed to a large vertical twenty or forty-foot oxygen cylinder. This is the most convenient form, perhaps, if portability is not desired.

To prepare the apparatus for use for a single dose anaesthesia, suitable for a dental operation, the oxygen bag is emptied of air

and partly filled with oxygen from the cylinder. If not over distended none of the gas will escape through the ball syringe until the bulb be squeezed. The two-gallon bag is similarly emptied, and its proximal end is sealed by putting the 3-way tap to the position marked "air." It is then moderately distended with nitrous oxide.



As soon as the facepiece is adapted to the face, the tap is snapped over at the end of an expiration to "no valves," the position of rebreathing. At the end of fifteen to twenty seconds the patient needs some oxygen, and four ounces are supplied to him by two squeezes of the bulb. Further known quantities of oxygen are supplied at such intervals as are indicated by the complexion, care being taken to steer between the two extremes of rosiness and cyanosis. Usually about four ounces of oxygen are required every 15 or 20 seconds, until from 6 to 10 ounces have been given in all; this will suffice for the 110 to 120 seconds required to

FIG. 1.

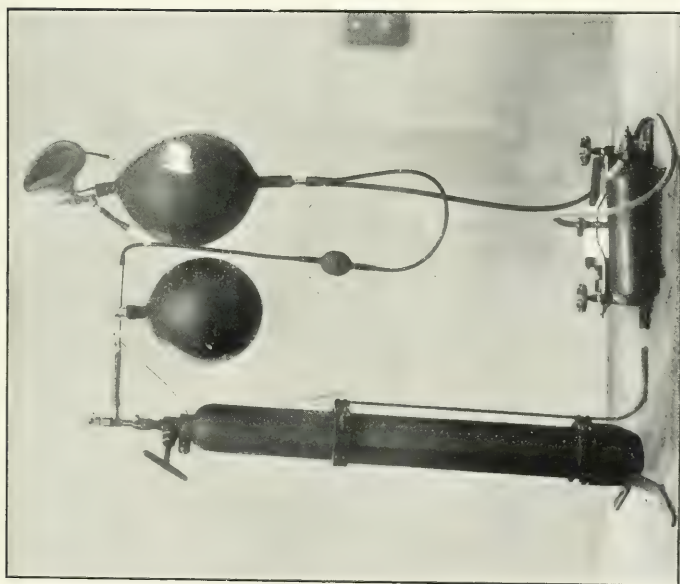
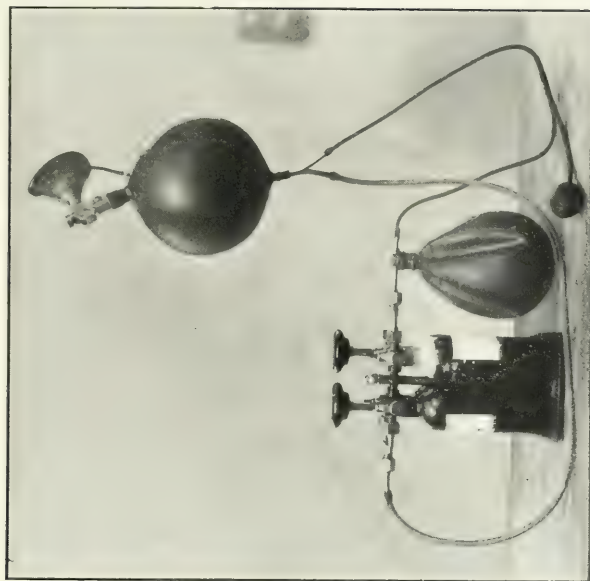


FIG. 2.



Two forms of apparatus. Fig. 1. Suitable for hospital use, with 20-foot oxygen cylinder and two 100-gallon nitrous oxide cylinders. Fig. 2. Portable form, with two 3-gallon nitrous oxide cylinders of same size, sufficient for from two to two-and-a-half hours' anaesthesia.

induce anaesthesia for a dental case. Fresh nitrous oxide is only supplied if the bag indicates a leakage of gas by beginning to collapse.

At the end of these two minutes the anaesthesia is quite deep enough for the extraction of two or three easy teeth, but if a deeper and more lasting anaesthesia is desired, from 1 to 3 c.c. of ethyl chloride (never more) is run in at the end of from twenty-five to forty seconds, and the mixture rebreathed for another thirty or more seconds, when a most beautiful anaesthesia, lasting from 70 to 100 seconds, results. Cases requiring a longer anaesthesia than that after the mask is removed are best dealt with by inserting the Clover inhaler, and giving a little ether with the gas and oxygen.

This system has now been in daily use at the Dental Hospital for five months. We have administered it in 800 cases, and we are satisfied that the results are very much better even than those obtained during the past years by gas or gas and ethyl chloride unmixed with oxygen. There is a striking absence of all crowing respiration and of cyanosis from too little or of excitement from too much oxygen. Danger to life seemed remote enough under the old system, but we are satisfied that the addition of measured quantities of oxygen must be an advantage to all patients, and that it may make the difference between slight risk and perfect safety in those cases of which old people with bad hearts and brittle arteries furnish examples, cases in which even experienced anaesthetists might feel some anxiety when using the old methods.

The average quantity of gas used is from 2 to 3 gallons, of oxygen from 6 to 12 ounces.

So far we have dealt with what we call "single-dose anaesthetics," such as are called for in dental work and for tonsils and adenoids. In minor surgery the same method may be employed, but at the end of each two minutes or so the bag must be emptied out to get rid of the CO_2 . The valve is put into the intermediate position, and the patient's expirations will then extrude the gases from the apparatus. When the bag is nearly empty the tap is put back to "no valves," and a fresh supply of gases run in. The amount of oxygen required to keep a good colour rises steadily with the first few bagfuls, until a point is finally reached when about 40 ounces of oxygen is being given in each new bagful, and another ten to twenty ounces is gradually introduced during the following two minutes. This gives a percentage of about 12, and corresponds with the figure arrived at by Hewitt in his experi-

ments made with a gasometer. Some cases need more than this, and the demand can easily be met by our apparatus.

As regards major surgery, nitrous oxide has many valid claims to be ranked above ether. It irritates no mucous surface or excretory gland; it produces no anemia and no reduction of the phagocytic power of the blood; it does not damage the central nerve cells. Ether does all of these things in varying degree. Above all other questions is that of the prevention of shock, and here Crile's results show that nitrous oxide is from three to four times more powerful than its rival. In some cases that might well make the difference between life and death, while in many more it will result in a rapid and pleasant convalescence, as against a delayed and uncertain one.

In many cases nitrous oxide and oxygen of itself gives too light an anæsthesia for abdominal work. It can be helped by the preliminary administration of a quite small dose of morphine and atropine, and by giving a little ether just to help the induction stage. The simplest method of doing this is to induce to a light degree of anæsthesia with drop ether given on the usual open mask, after which it is possible to maintain anæsthesia for an almost indefinite time by the gases alone. This method we derived from a paper by Flemming of Bristol, to whom we are also indebted for much useful information given privately.

Proceeding by this plan we find abdominal section quite a feasible operation in a large group of cases. Fortunately, many of the cases which most clearly demand the advantages of nitrous oxide have not very strong abdominal walls, and can be dealt with without seriously adding to the worries and work of the surgeon. Put briefly, the position is that the surgeon's loss is the patient's gain, more particularly in what Crile calls "bad surgical risks." Short as our experience has been, we can already quote a number of cases where the patients have recovered from grave conditions with a rapidity and what one may call a certainty that could not have been anticipated had ether been given throughout the operation.

Our list of 80 surgical cases includes gastro-enterostomies, hernias, extensive breast operations, amputations, goitres, and many minor cases, such as pelvic abscesses and the like. Up to the present we have had no opportunity of giving it for the alleviation of the pangs of labour, a purpose for which it is obviously well suited in cases where a little extra expense is not a matter of moment. Our youngest patient was 2 $\frac{1}{4}$ and our

oldest 69. The longest period for which we have given the gases is 75 minutes, to which we attained on two occasions. Both of these cases woke in a few minutes perfectly fresh, and apparently little the worse for their experience.

We can best illustrate and conclude our paper by reading the notes taken of three cases, in all of which we believe the method was a very real factor in the recovery of the patient.

CASE I. (Ref. No. 31).—M., *act.* 20, profoundly septic from a foul appendicular abscess and general septic peritonitis. Morphia, gr. $\frac{1}{4}$, and atropine, gr. $\frac{1}{120}$, given just as the patient went to the table. Open ether for two minutes, after that nothing but the gases. The abscess was opened, adhesions broken down, and the appendix removed. A suprapubic drain was also inserted. The surgeon reported that although the muscles were distinctly rigid, the anaesthesia was adequate for his purpose. Patient vomited once when the mask was removed, but never afterwards. On removal to bed he expressed himself as none the worse, and was very delighted to hear that all had gone well and that he was free of his enemy. The convalescence was quite amazing considering the condition found, and the ultimate good result never seemed for one minute in doubt.

CASE II. (Ref. No. 50).—M., *act.* 39, absolutely exsanguinated by bleeding from a gastric ulcer. Morphia, gr. $\frac{1}{4}$, and atropine, gr. $\frac{1}{120}$, given twenty minutes beforehand. Induction by open ether, then the gases for the remaining 30 minutes. The anaesthesia was quite adequate, and the abdominal wall gave the surgeon no serious trouble. The pulse improved very materially after the gases were started. There was no after-vomiting whatever. The man spoke as he was being put to bed, and made a very rapid convalescence. His chief complaint next day was that he was not allowed to smoke.

CASE III. (Ref. No. 73).—M., *act.* 38, who had had a gastro-enterostomy done 17 days previously, and had begun to vomit 7 days later. He was much emaciated, had a very feeble pulse, and his chances seemed far from good. Morphia, gr. $\frac{1}{4}$, and atropine, gr. $\frac{1}{100}$, was given twenty minutes beforehand, and open ether was used to induce anaesthesia. For the remaining 35 minutes nothing but the gases was given. An internal hernia was found and remedied. The anaesthesia was fair, slight reflex movements of the legs appearing once, but the difficulties were not found

seriously embarrassing by the surgeon. The pulse improved very materially in quality during the operation. The man was conscious before leaving the table. He never vomited at all, and expressed himself as confident of recovery from the very outset.

NOTE ON THE INCORPORATION OF SURGEONS AND BARBERS.*

By R. SCOTT MONCRIEFF.

NOT only the medical profession but the general public have been much interested in the litigation which has recently been going on between the College of Physicians and the College of Surgeons as to which of these distinguished bodies had the right of precedence. It is not the first litigation dealing with their status in which the surgeons have been engaged, and in the hope that this other passage in their history may also be of interest I propose to deal in this article with the efforts made by them to free themselves from their connection with their quondam confrères the Barbers.

The Surgeons and Barbers of Edinburgh were officially incorporated as one body by an act of the town council termed a Seal of Cause which is dated 1st July 1505, and which was duly ratified by James IV. on 13th October 1506, and again by James VI. on 6th June 1613. It must not, however, be concluded from the fact of their official incorporation as one body in 1505 that the two crafts came together for the first time in that year, for the deed shows that for at any rate some time prior to that date they had been closely associated together in the upkeep of "an altar situate within your College Kirk of St. Geill in the Honour of God and St. Mungo our Patron." The Seal of Cause, which is a most interesting document, lays down the privileges and regulations of the new Corporation. It is only necessary for the present purpose, however, to refer to two of the clauses. The second regulation runs as follows:—"Item that no manner of person occupy nor use any points of our saids Crafts of Surgerie or Barber Craft within this Burgh but gif he be first free man and Burgess of the samen and that he be worthie and expert in all the points belongand to the saids crafts diligently and avisidly examined and admitted by the masters of the said craft for the honourable serving of our Sovereign Lord his Leiges and Neighbours of this Burgh, and also

* A paper by the author upon this subject, but in a slightly different form, was read to the Society of Antiquaries of Scotland upon 11th March 1912.

that every man that is to made freeman and master among us be examined and provite in thir points following That is to say That he know Anatomia Nature and Complexion of every member human's Body and in likeways that he know all the veins of the samen that he may make Flewbothomia in due time and als that he know in whilk member the sign has Domination for the time, for every man ought to know the nature and substance of every thing he wirks, or els he is negligint, and that we may have ains in the year an condemnet man after he be dead to make anatomia of wherethrow we may have experience ilk an to instruct others and we shall do suffrage for the saul and that nae Barber nor Master nor Servand within this Burgh haunt use nor exerce the Craft of Surgerie without he be expert and know perfectly the things above written and what persons that shall happen to be admitted freeman or master to the said Crafts or occupys any point of the samen shall pay as his entry for his upsett five pounds usual money of Scotland to the reparation and upholding of our said altar of St Mungo for divine service to be done thereat with a dinner to the Masters of the saids Crafts at his admission and entress amongst us exceptand that every freeman Master of the saids Crafts ane of his lawful gotten sons to be free of any money paying except the dinner to be made to the Masters after he be examined and admitted by them as said is." And the next clause runs: "Item that nae master of the said Crafts sall take prentice or fietman in time coming till use the Surgeon Craft without he can baith wryte and read," etc.

The above clauses seem to indicate that at all events in 1505 a member of the Corporation might practise either as a surgeon or as a barber or as both, provided he had the necessary qualifications; and further, that if a man practised both crafts any apprentice or assistant he employed in connection with the surgical part of his business was obliged to be able to read and write.

The further privilege of exemption from serving in the army or as juryman was conferred on the surgeons by Queen Mary in 1567.

The two crafts worked together in comparative amity until the beginning of the seventeenth century, when the surgeons, aspiring to higher social rank, found their progress retarded by their connection with the barbers. Not that the "surgeon barber" had by that time ceased to exist, for by the 20th Chapter of the Statutes of George Heriot's Hospital, which were adopted in 1627, it is provided that there shall be "one Chyrugian Barber who shal Cut

and Poll the Hair of all the schollars in the Hospital; as also look to the Cure of those within the Hospital who any way shal stand in need of his Art." Still there is no doubt that the two crafts were drifting further and further apart, and the first definite step towards separation was taken in 1648. In that year, according to the barbers, the surgeons took advantage of the fact that there were in Edinburgh ten surgeons and only six barbers, and passed an Act and Statute whereby admission into the Corporation was restricted to such as should be tried and found qualified in surgery. This resolution, which they maintained was but the strict enforcement of those terms of the Seal of Cause which had been allowed to fall into desuetude, effectually barred the entrance of the barber pure and simple.

About the same time, 20th April 1649, the incorporation induced the town council to order all surgeons and barbers practising in the suburbs under the jurisdiction of Edinburgh, namely, the Canongate, Leith, Broughton, Portsburgh, and other pendicles, to take down their signs or basins until they had obtained liberty to practise from the Corporation of Surgeons and Barbers of Edinburgh. To this ordinance the bailies of the Canongate at first paid no attention, whereupon the city of Edinburgh appointed John Denham, one of their own bailies, together with James Borthwick, Deacon of the Surgeons, to go down the Canongate and "see course and order taken with the non friemen barbers." Four of these contumacious gentlemen were thereupon summoned before the town council and admonished, while the bailies of the Canongate were informed that if they did not carry out the ordinance "the deacon of the said craft with concurrence of the officers of this burgh are hereby authorised to pass to the said Burgh of the Canongait" to compel observance.

It will be noted that there was no question of the barbers in the suburbs becoming members of the Corporation or being asked to pass in surgery. They were not burgesses of the City of Edinburgh, and so were ineligible in any case for admission to that select body. They were merely dependants who had to obtain a licence to practise their calling as barbers in any district under the lordship of the city.

The result of the measure excluding the city barbers from admission to the Corporation unless they could pass in surgery was soon felt, as the inhabitants of Edinburgh began to experience a difficulty in getting shaved and poled. To what state of hairy discomfort the citizens had been reduced by the year 1682 it is

impossible to say, but on 26th July of that year an Act of the town council was passed which shows that it was considerable. This Act runs on the narrative that the Lord Provost, Magistrates, and Council, etc., "taking to their consideration that there is great scarcity of good qualified persons within the city who have skill to trim and barberise so that a considerable number of the inhabitants are forced to go to the suburbs to be trimmed, as likewise it has occasioned many complaints to be made by noblemen and others resorting to the town that they cannot be conveniently served by persons of that employment within the town and to the effect the lieges may not have sufficient ground to clamour upon that account, therefore they recommend to the deacon and incorporation of chirurgens to take some effectual course that the city be furnished with a competent and suitable number of persons skilled in the art of cutting hair and taking off of beards and that upon payment of such compensation as the said incorporation and these persons can best agree; Declaring that if they did not speedily fall on some course to answer the expectation of the lieges in that point that they will not espouse or own their interest in case any attempt should be made by application to superior judicatories for causing the Incorporation of Chirurgens to receive into their freedom such a number of barbers as they shall think fit: Declaring likewise that in case they should voluntarily admit a competent number at present or any time hereafter of persons skilled in these points that they shall be holden as depending upon the said incorporation and liable to the laws and acts of their calling."

It will be noted that while in 1649 the Corporation is referred to as that of Surgeons and Barbers it has now become the Corporation of Surgeons. It will also be noted that in the event of the surgeons voluntarily admitting barbers "they shall be holden as depending upon the said Incorporation."

Following upon this Act a number of barbers were admitted as free barbers of the Corporation, the terms of their admission varying greatly in each case. In some they were admitted with the privilege of thereafter entering as surgeons should they pass the necessary examinations; in some with extension of privileges to sons and sons-in-law; and in one case—that of Reuben McRobbie—only during the lifetime of Mrs. McRobbie, *née* Rebecca Pringle, daughter of Surgeon David Pringle.

The surgeons next strengthened their position by getting a new gift under the Great Seal, dated 28th February 1694, ratifying

their rights as surgeons, and conjoining with them, not their former associates, the barbers, but the apothecaries, thereby creating that "mongrel body" of surgeon-apothecaries, as the barbers afterwards termed it. This new gift, which gave the new incorporation full power over all persons exercising surgery, pharmacy, or barbering within the bounds of the city of Edinburgh, was duly confirmed by Parliament on 17th July 1695.

Thus fortified, the surgeons began to consider that they, and they alone, were the Corporation; the barbers, although nominally admitted as freemen, being allowed no say in the administration, and getting no advantage of the fees which they had to contribute. They were regarded as merely licensed to pole and shave. Naturally the barbers grew restive under this treatment, and matters culminated in 1718 in their raising an action for restitution of their rights under the Seal of Cause. In the summons they complained of the arbitrary way in which they were admitted, of the fees levied, which are in one place stated to have amounted to no less than 140,000 merks, or £7694 sterling, and which money had been applied by the surgeons "for their own ends, without applying for the poor of the barbers any part of it by quarterly pensions or so much as the value of two upsets" (entrance fees) "any way since the pretended dependence in 1682." The barbers in their pleadings maintained that the Act and Statute of 1648, insisting on the barbers having a knowledge of anatomy, was *ultra vires* and contrary to the terms of the Seal of Cause, and that all subsequent acts of the town council and of Parliament were of no effect so far as they, the barbers, were concerned, they not having been parties to them. The surgeons maintained that nothing had been done in 1648 save what had already been done by the Seal of Cause, wherein anatomy was laid down as a necessary subject of examination, that the barbers had never been members of the Corporation, but had merely been dependent on and licensed by the surgeons in the same way as were cobblers by the Corporation of Shoemakers and wheelwrights by the Corporation of Wrights. To this the barbers demurred, maintaining that the subjects of examination laid down by the Seal of Cause were clearly applicable to the surgeons alone, and they offered to prove by the books of the Corporation itself that they had been full members of the Corporation up to 1648, and these books they accordingly called upon the surgeons to produce. This the surgeons, while protesting that they had nothing to conceal, refused to do, whereupon the Court ordered their exhibition to the barbers upon a certain day

and at a certain place. When the day came the representatives of the barbers attended at the hour and place, but the clerk of the surgeons was found to have "stepped out of the way, and the books were not forthcoming." Then followed another and more peremptory order from the Court, who stigmatised "the stepping out of the way" as a mere shifting and pretence. The surgeons' clerk, however, was wise in his day and generation, for the books on being produced conclusively proved (first) that surgeons alone had been asked to pass the examination in anatomy, etc., and (second) that up to 1648 barbers had been admitted to all the privileges of the Corporation, and had not only attended and voted at meetings, but on some occasions had held office.

This demolished the surgeons' first line of defence, obliging them to fall back on their second line, namely, that the Act and Statute of 1648 and the subsequent Acts of the town council and Parliament had altered the position of the barbers to that of mere licence-holders. This view the Court to a certain extent sustained, declaring that although the then existing barbers were members of the Corporation they were not entitled to all the privileges thereof. The Court then laid down the privileges they were to enjoy, which were briefly as follows:—(1) That the barbers were to be allowed to appoint their own preses and box-master (treasurer); (2) that they were to have absolute freedom in the management of their own affairs, and the entire control of the funds contributed by themselves; (3) that all their apprentices were to be registered in the books of the surgeons, and a payment of 5s. each made for doing so; (4) that the clerk of the surgeons was also to be the clerk of the barbers; and (5) that the right enjoyed by the Corporation of presenting four children to the Trades' Maiden Hospital was to be shared equally by the two bodies, the surgeons having a right to present two, and the barbers having a right to present two. Should the surgeons have no children to present the barbers were to be entitled to these rights also, and—which shows that the connection between the two crafts was not entirely severed—all presentations, whether for the children of surgeons or of barbers, were to be signed by the officials of both bodies. In fact it was a degree of separation owing to incompatibility of temper and not a divorce, and this view the barbers had afterwards to maintain, and did successfully maintain, before the Court of Session in their action against the wigmakers, hairdressers, etc., who tried to infringe their monopoly.

The next formal change in the relationship of the two bodies

took place in 1845, when the surgeons approached Parliament for a new grant of incorporation. In order to simplify their proceedings an agreement was come to between the two bodies, whereby, in consideration of an annual payment of £10 and a release from all other obligations, the barbers renounced their right to the reversion of the surgeons' rights of presentation to the Trades' Maiden Hospital.

Thus have the links between these two ancient allies been gradually severed until but two remain—that is, assuming always that the Society of Barbers is still extant, which is a matter of considerable doubt—viz. the obligation of the College of Surgeons to pay £10 a year to the Society of Barbers, and the fact that an entrant to that Society is admitted and received “as the Joint Incorporation of Surgeons and Barbers hereby admit and receive” him.

The death-blow to this once powerful Society was the passing in 1847 of the Act of Parliament abolishing restricted trading. Thereafter any one who chose could put up his pole and practise his calling, and there was thus little inducement to strangers to pay the heavy entrance fee demanded by the Society. Had it not been that the sons and sons-in-law of members, who were admitted on easier terms, found it worth their while to join on account of the small widows' fund the Society would have come to an end many years ago. It has, however, lingered on, with an ever-decreasing muster-roll. The last member was admitted to the Society on 12th September 1885; the last meeting was held on 17th September 1892. At that meeting the whole Society—a father and son—were present. They elected each other preses and box-master respectively, reappointed their clerk, and departed to meet no more. The preses died, the box-master left the country, and has not been heard of for years, and the clerk alone is left, with the old oak treasure box, the minute books, and papers in his keeping.

SECRETORY ACTIVITY IN THE MAMMARY GLANDS INDEPENDENTLY OF PREGNANCY.

By JAMES OLIVER, M.D., F.R.S.(Edin.), F.L.S.,
Physician to the Hospital for Women, London.

THE mammary glands secrete a fluid, the character of which is practically the same in all mammals, although its composition varies slightly in the different species. It is intended for the

early nourishment of the young of the individual furnishing it, hence the functional activity of the mammary glands is, under ordinary circumstances, definitely related to the process of gestation. This activity in the human female is aroused as early as the fourth week of pregnancy, whether the oosperm is located in the uterus or in some structure outside this organ, and after parturition it is supposed to persist in all mammals until the offspring is able to subsist upon other food. In this country we are accustomed to look upon nine months as the duration of the lactation period for a human infant, but in this country occasionally, and in many barbarian and semi-civilised quarters commonly, the women suckle their children for two and sometimes even for three years. In the brute creation, however, the length of time the young are suckled appears to depend chiefly upon the indulgent nature of the mother. The secretion of milk is undoubtedly peculiar to the mammary glands, yet in one bird, viz. the pigeon, a similar secretion is produced in consequence of a seasonal change in the mucous membrane located in the lateral pouches of the crop of that bird. It is noteworthy, however, that this secretion is furnished not only by the female but also by the male parent, and that the hypertrophied mucous membrane which produces it becomes physiologically fit three or four days before the young are hatched, and continues active for three or four days after the young are hatched. In the pigeon it may be remarked in passing that the secretory phenomenon just referred to cannot in the male parent at least be attributed to any suspected hormone.

One of our greatest physiologists has shown that secretory activity may be aroused in the mammary glands of the rabbit by injecting into the peritoneal cavity of an adult female the fluid parts of the whole of the viscera of foetal rabbits or the filtered extract obtained from the carcasses of foetuses from which the viscera had been removed. Relying solely upon the results of his experiments, Starling came to the conclusion "that the growth of the mammary glands during pregnancy is due to the assimilatory or inhibitory effects of a specific hormone produced in the body of the foetus and carried thence through the placenta by the foetal and maternal circulations."* It is common knowledge that immediately the fertilised ovum of any mammal begins to abstract nutriment from its nurturer, whether through the uterus or any maternal structure outside the uterus, the mammary glands become forthwith the seat of activity. Referring

* Croonian Lectures, June 1905.

to this point in the case of the rabbit Starling says: "Five days after impregnation, when it is still impossible to find the impregnated ovum with the naked eye in the enlarged uterus, the mammary glands are marked out as small pink patches about two centimetres in diameter just under each nipple. On microscopic section the gland is found to be made up chiefly of ducts, which, however, are undergoing rapid proliferation. The cells lining the ducts are about three deep, and present numerous mitotic figures." It will be observed that before any close relationship is established between the foetal and maternal circulations there is already evidence of mammary activity, and in the case of the whale, where gestation is completed without any close relationship between the foetal and maternal bloods ever being established, there is throughout gestation evidence of marked activity in the mammary glands.

Now it not infrequently happens that milky fluid is obtainable from the human female breast independently of the influence of pregnancy, but it is noteworthy that this condition of affairs obtains apparently only in women living a marital life. I have observed its occurrence in women who had already borne children and in women who had never even been pregnant. It may be noted within two or three months after marriage and after prolonged periods of sterility, and I have seen it persist for years in spite of the continuance of a state of sterility. It may or may not be noted in conjunction with some trifling derangement or some gross lesion of the organs of generation. I have seen it associated with cystic degeneration of one or both ovaries, with one or more fibroid neoplasms in the uterus, with descent of both ovaries, and with more or less leucorrhœal discharge and no other apparent derangement. In not a few of the cases the attention of the patient herself was attracted to the breasts because the milky fluid oozed spontaneously from them, but in the majority of cases the fluid is only obtainable by firm but gentle pressure upon the breasts.

The presence of milky fluid in the breasts is consequently not an infallible sign of pregnancy, and it is an extremely perplexing phenomenon when noted in conjunction with some ovarian or fibroid tumour causing enlargement of the abdomen, especially when there is also more or less marked irregularity of menstruation.

In married and single women alike the breasts occasionally at the time of menstruation become "lumpy" and painful, but in such cases I have never been able to obtain any fluid from the breasts.

CLINICAL RECORDS.

TWO CASES OF SPONDYLITIS—ONE RHEUMATIC, THE OTHER INFECTIVE.

By J. MAC'KIE WHYTE, M.A., M.D.,
Physician, Dundee Royal Infirmary.

THE two cases I am about to describe are interesting as illustrating certain difficulties in diagnosis of affections of the spinal column. The question of treatment depends so completely on a correct diagnosis in such conditions that a record of experience is likely to be useful.

CASE I.—James M., 47, calender worker, admitted to Dundee Royal Infirmary 25th July 1912. Father died at 72, and for many years was rheumatic. Patient had been in the Army for 9 years, but had no entries in his medical case-sheet. In April 1912 began to have persistent pain in upper part of spine, the pain passing outwards to shoulders and down as far as elbows. Stiffness in turning movements. Sleep hardly got without aid. Seen on admission to be of rather slight build, dark complexion, tendency to pigmentation of skin: general condition healthy. Held body stiffly, especially spine from neck to mid-dorsum. Occipito-spinal joints not affected. No great tenderness on depressing skull suddenly, or on pressure over spinous processes. No supinator or biceps jerk on either side, triceps jerk slight. No affection of sensibility beyond pain. Lower limbs normal. An X-ray photograph by Dr. Pirie showed a lighter appearance in body of 6th cervical vertebra, also two cervical ribs attached to 7th vertebra, the right stumpy, the left about $2\frac{1}{2}$ inches long, with a joint at proximal end, and a cap of cartilage at the other. This rib was straight, and probably caused no symptoms. Temperature never up—usually 97° to 98°. During the first weeks pain was very constant and severe, but during the fortnight preceding his departure he improved rapidly, pain practically disappearing. Could move with greater freedom, though stiff. He left on 26th September.

Treatment.—Rest on back, with head low, blisters, liniments, Donovan's solution, sedatives such as codeonal (3 to 4 tablets) or $\frac{1}{6}$ gr. morph. when sleep otherwise impossible. He thus got 3 or 4 hours' rest.

On 7th November feels well, been working, still stiff, can rotate neck, and flex and extend spine but not freely. Feels a pain in back of neck on lifting a heavy weight. Generally speaking, free from pain.

Remarks.—The pains were in regions supplied by the 3rd, 4th, and 5th cervical roots, and were symmetrical. No evidence of involvement of cord or pia-arachnoid. Pachymeningitis would soon have caused much more severe and varied symptoms. The temperature excluded

any acute inflammation. Neurasthenia, tumour, syphilis were also out of account. The main question was between tuberculosis and rheumatism. In the mixed class of rheumatic affections of the spine we can distinguish at least osteo-arthritis and simple rheumatic spondylitis. The former is almost sure to be more extensive than in this case, probably involving other than spinal joints, less painful, and more steadily progressive. Was it, then, a case of simple rheumatic or tuberculous inflammation of vertebrae? The light appearance of the body of the 6th cervical vertebra was thought to point to a tuberculous process, but my colleague, Mr. Greig, who helped me much in making a diagnosis, thought this might be due to an unossified portion of notochord which is sometimes found. The high position of the affection in a man of 47 was against tubercle; for while cervical caries is common in the young, it is more common in adults to find it in the lower dorsal or lumbar region. The fairly long duration without great aggravation of symptoms before any treatment was begun, the great improvement in hospital without fixation, and the absence of any tendency to compression or abscess were all against the more serious diagnosis. Thus by exclusion a diagnosis with a good prognosis was arrived at, viz. simple rheumatic spondylitis. Still it would be difficult to say that the word "rheumatic" in this condition is a final and satisfactory term: it connotes a disease-process something like fibro-myositis in the deep muscles, the many ligaments and fascial layers, and perhaps the periosteum of the vertebrae.

CASE II.—J. R., aged 33, a baker, admitted to Dundee Royal Infirmary on 23rd September 1911, complaining of headache and pain in back and thighs. At the age of 17 a hæmoptysis made him leave his trade and go to sea for a time. A brother died of phthisis. He is apt to exceed in taking alcohol. For two years or so he had stiffness in back in the morning, and for a couple of months a stiffness in thighs, but *pain* came on first 12 days before admission. This was located in small of back, and also in hip regions and down thighs. It came on suddenly, with a feeling of chill and waking him up in the morning. It was made worse by movement. A dull frontal headache, with afternoon feverishness and loss of appetite, had been present. There had been nocturnal sweats.

On admission he was seen to be a stout, strong-looking man of average height, his weight being 12½ stone. A detailed examination of the various systems showed nothing wrong, except in the regions where the pain was complained of. There was pain over the lumbar spine, but little or no tenderness, and no deformity. No pain produced by jolting from pressure on vertex. Flexion of body on thighs, or of thighs on body, produced unbearable pain. There was no limitation of movement or other symptom of disease at the hip joints. The pain

was in the lower lumbar region and very localised. Dorsiflexion of the spine did not trouble him so much as bending forwards, and a cushion under the hollow of the back eased him when lying. Reflexes were normal. No affection of sensibility to touch, etc. The X-ray report was that the bones were fairly normal on the screen, but on the plate the 1st lumbar vertebra seemed dim, less dense than normal, and at each side of it there was a shadow "like the commencement of a psoas abscess." Leucocytes were 12,000. The only other important point was the *temperature*. For the first four days subnormal, but thereafter till he left of his own accord on 2nd November it was markedly swinging in type, going from 98° or 97° in the morning to 101°, 102°, or even 103° at night. The pulse also rose at night to 100, more or less.

The pain was kept under, mainly by aspirin: but sometimes it was obviously very bad, being associated with cramps in legs and referred pains in abdomen. He left on 2nd November.

After three months he was readmitted, and he said he had lain in bed practically all the time at home. He had gained a stone. Leucocytes now 7500. His pain seemed to be of much the same kind and intensity as before. Any movement which stretched the sciatic nerves brought it out. There was evidence of spinal stiffness, but still no deformity, and the X-ray report showed nothing out of the usual. The pain was felt as low as the calves now, but there was no disturbance of reflexes, and no other objective signs of spinal cord disease. Patient said he had no rise of temperature at home, and during this month's residence in hospital it was normal. The pain got less, and when he left there was little wrong but stiffness behind his left knee.

On 31st August he showed himself again, apparently quite well, stouter than ever, and ready to resume work with my sanction, which he got.

Remarks.—I was and still am much puzzled by this case, although the course of events helps to narrow down the list of possibles. We could exclude affections of cord or cauda: hysteria, neurasthenia, and malingering: fibro-myositis, pachymeningitis, osteo-arthritis. Reasons against these are too obvious to need statement. In addition to the pyrexia, which lasted six weeks or so, we have these points to bear in mind—alcoholic habit: stiffness in back in morning for two years: stiffness of thighs for two months: sudden onset of pain twelve days before admission, with infective symptoms: pain localised chiefly in lower lumbar region, but aggravated on flexion of spine or on movements of extension of sciatic nerves: steady though slow improvement, the fever and pain disappearing before the stiffness in back and lower limbs: finally, complete recovery. Vertebral tuberculosis was considered a probable explanation at first, but the absence of tenderness on pressure or jarring, absence of deformity or compression signs,

the leucocytosis, and the general appearance of the man were against this. I am inclined to think that some infective process was at work, not unlike that known as "typhoid spine." This condition is described as coming on towards the end of an attack of typhoid, with severe lumbar pain radiating in different directions, spine rigid, pyrexia frequent, duration variable but tending to be chronic (up to a year or more). Its nature is not certain, but it appears to be a result of invasion of the vertebrae or their related structures by the typhoid bacilli. Again, gonococci may produce a spondylitis. In my case there was no pus or albumen in the urine, but no special inquiry after a urethritis was made. There was no typhoid fever—that is practically certain. In another similar case a thorough bacteriological investigation might help to clear matters up. The stiffness in back and legs long before the acute attack might be associated with the alcoholic habits.

NOTES ON THE TREATMENT OF A CASE OF LYMPHOSARCOMA BY RADIUM.

By DAWSON F. D. TURNER, M.D., F.R.C.P.,

Physician in Charge of Radium Department, Royal Infirmary, Edinburgh.

A MALE, aged 65, was recommended to me by Professor Alexis Thomson for radium treatment in June 1911. He was suffering from a recurrent small-celled lymphosarcoma, which was inoperable. The first operation was performed on 21st August 1909. The tumour was then situated in the axilla, and both pectorals were divided to permit of its removal, along with a number of satellite glands. On microscopical examination the growth was found to consist of a small-celled lymphosarcoma. About a year and a half after the operation there was a recurrence; this took the form of a swelling somewhat deeply placed below the left clavicle, and of enlarged glands in the neck forming a mass of about the size of a small orange. There were no symptoms beyond some stiffness and tightness in moving the left arm.

Radium treatment was begun on 13th June 1911. The tumour was attacked both from the outside and from the inside, and the glands from the outside. A glass tube in an aluminium case containing twenty milligrammes of radium bromide was inserted by Professor Thomson into the mass below the clavicle. The tube was attached to a silk thread so as to enable it to be withdrawn when desired. At the same time external treatment to the glands above and to the swelling below was commenced. A capsule containing forty milligrammes of the salt was applied daily for four hours to the glands above and for four hours to the swelling below. The capsule was made of aluminium, one-third of a millimètre thick, and a screen of silver one-half millimètre thick was

interposed to protect the skin from the alpha and soft beta rays. The applications were also always made to different areas, no single area getting more than a single dose. As a result of this precaution the skin never showed more than a moderate reaction. After remaining *in situ* for a week the internal tube was moved a little by its thread so as to expose a fresh surrounding to its influence. After a lapse of thirteen days the internal tube was removed altogether. Professor Thomson now observed that the tumour had ceased to grow. The external treatment was continued a few days longer. The total internal dose amounted to 6240 milligramme hours, the external dose to 8680 milligramme hours. On examination a fortnight later considerable improvement was observed; both the enlargements had diminished in size, particularly the lower one.

There was, however, a glandular mass somewhat deeply placed above the clavicle, which, owing to its depth, could not easily be reached by the external application of radium, and accordingly it was resolved to insert a tube of radium into it. A week later Professor Thomson attempted to do this, but found it impossible without exposing the glands by an open operation; he therefore gave a general anæsthetic and resected the greater part of the clavicle, and as he found on exposing the glands that he could remove the main mass he proceeded to do so. Thereafter a tube of radium was placed in the cavity and left there for one week. The dose was one of 3360 milligramme hours. Three months later, on 22nd October 1911, the patient was examined by Professor Thomson, who could find no trace of the disease. A year has now elapsed and the patient has remained quite well and been able to engage in his ordinary avocations.

MEETINGS OF SOCIETIES.

Edinburgh Medico-Chirurgical Society.

THE first meeting of the session was held on 6th November. Mr. J. M. Cotterill, President, in the chair.

Dr. Allan Jamieson showed a specimen of *Schleichera trijuga* oil.

Mr. J. W. Struthers read a paper on "*Perforated Duodenal Ulcer*," which is published on p. 505.

Discussing the paper, Mr. Cotterill said that the absence of a history of mælena in so many of Mr. Struthers's cases was rather remarkable. In cases in which there was doubt as to the diagnosis he preferred to make an incision low down in the pelvis, examine the appendix, and, if necessary, make a second incision higher up. The lower incision was useful for drainage. We were not yet in a position to say that gastro-enterostomy should be done in every case, although it was advisable if the patient could stand it. Some cases gave excellent results without gastro-enterostomy, and results were not always perfect after that procedure had been followed.

Professor Caird congratulated Mr. Struthers on his good results. He thought the practitioner was becoming more alive to the urgent necessity of early operation in these cases. He had frequently noticed improvement of the pulse after the abdomen had been opened, but he was not so certain that the good effect was always maintained after washing out the peritoneal cavity. He always at least washed out the pelvis. He favoured gastro-enterostomy after closure of the ulcer. A good deal depended on the aspect of the duodenum after closing; there might be considerable narrowing.

Mr. Cathcart said that if the amount of effusion was slight there was no necessity to wash out, but it did no harm; it often did good in removing fluid from the region of the diaphragm. He had seen sub-phrenic abscess follow in cases where washing had been omitted. He thought the presence of symptoms depended on the presence or absence of inflammation round the ulcer. The pain was sometimes due to spasm following hyperchlorhydria.

Professor Alexis Thomson was convinced of the great advantage of gastro-enterostomy. In addition to the other reasons which had been adduced in favour of this course he had found that the ulcers were frequently multiple. His experience was that of the author with regard to bleeding. The cases with much bleeding did not often perforate.

Mr. Wallace wished to emphasise the importance of not overlooking the condition during the latent period. He had operated on three cases in which symptoms had entirely disappeared by the time he had seen them. He had also had difficulty in cases where the pain was referred to the right iliac fossa. He favoured gastro-enterostomy, but reminded the meeting that an American surgeon had analysed a long series of cases and found the results after gastro-enterostomy and those in which it had not been performed were about equal.

Mr. Miles said that when he was in doubt as to the seat of trouble he made a small suprapubic incision and passed a tube into the pouch of Douglas. From the characters of the fluid it was usually possible to tell the seat of rupture, and he then made a second incision where it was needed. The absence of food material from the peritoneal cavity was doubtless due to the fact that the pylorus contracted when the rupture took place. He had once seen a perforation take place when the stomach was being handled in doing gastro-enterostomy for a chronic ulcer. The use of catgut or silk was a matter of individual preference. He used silk, as a smaller needle could be employed. It was his custom to wash out the peritoneum, though he was not prepared to say that was a procedure which must always be carried out. He did not think the position that gastro-enterostomy should always be performed had yet been reached, and if it were laid down that an operation for perforation was incomplete which did not include gastro-enterostomy it might discourage practitioners from undertaking the operation in cases of emergency in which the help of a surgeon could not be obtained. In four cases he had performed pyloroplasty by splitting the pylorus longitudinally and stitching transversely. The pyloroplasty was, however, not equal to the gastro-enterostomy opening. He gave statistics of 34 cases in which he had operated for perforated duodenal ulcer.

Mr. Dowden said he had opened the abdomen on three occasions for typical symptoms of ruptured duodenal ulcer, but nothing had been found. In distinguishing between ruptured duodenal ulcer and acute appendicitis he had found percussion very useful as a means of eliciting the seat of most tenderness. He preferred to make two separate incisions in cases of doubt.

In closing the ulcer he cut through the pylorus and continued the cut down the long axis of the duodenum, thus producing a pyloroplasty. He always had the pouch of Douglas flushed out while he was stitching up, and then closed up everything, leaving as much fluid as possible in the peritoneal cavity.

Mr. Wilkie referred to the age incidence of the condition. There were two groups, one affecting young men, and the other in patients aged from 48 to 60. In the latter there was generally a history of hard work and alcohol, and there was nearly always arterio-sclerosis. The ulcer in this group was almost always at the upper border of the anterior wall, where there was great difficulty in getting an anastomotic blood-supply if one artery were interfered with. He had found duodenal ulcers in twelve cases post-mortem, in only two of which had the condition been suspected during life.

Drs. Wm. Guy and J. S. Ross read a paper on "*Nitrous Oxide and Oxygen as an Anæsthetic for Dental and Surgical Purposes*," which is published at p. 517. It was contended that this method had three great advantages—(1) It gave an anæsthesia closely resembling natural sleep. (2) It interfered little with respiration, circulation, and alimentation. (3) It was safe. Why it had not found a wider field was the cumbrous nature of the apparatus hitherto in use. A simple form of apparatus was described, by means of which it was possible to administer measured doses of both gases. The method lent itself admirably to short operations, but it was probable that the expert would be required to carry out the administration in prolonged surgical operations. The cost was about 3s. 6d. per hour.

Mr. Wallace said he had seen the method in use in surgical operations. It required the assistance of an expert administrator, but its field of usefulness was just in those cases where an expert anæsthetist was likely to be called upon.

Mr. Wade said that the method was certainly of value in those cases in which a fatty liver and other conditions might make the surgeon fear the effects of a general anæsthetic.

Mr. J. S. Fraser, while not denying that this might be an excellent method, said that ethyl chloride had been given in the Ear and Throat Department of the Royal Infirmary in some 9600 cases without any inconvenience to the patients, and the simplicity of the method was a great advantage.

Dr. Dawson Turner read notes on the "*Treatment of a Case of Lymphosarcoma by Radium*," which is published on p. 536.

Professor Alexis Thomson remarked that the tumour was both clinically and microscopically one of small-celled sarcoma, and before the use of radium it had been quite irremovable.

Forfarshire Medical Association.

THIS Association met on the afternoon of 18th October, when Dr. G. Lovell Gulland delivered the inaugural address for session 1912-1913, the subject being "*Pernicious Anæmia*." Dr. J. S. Y. Rogers, Vice-President, occupied the chair.

Dr. Gulland defined the disease "as an anæmia of high colour index and of megaloblastic type," and stated that in his experience it was becoming

more and more frequent. He discussed briefly the etiology, and then proceeded to a consideration of the diagnosis, and emphasised in this connection the paramount importance of a thorough investigation of the blood, particularly in cases which showed symptoms pointing to disorders of the alimentary tract, the kidneys, and the nervous system. The lecturer illustrated the points with cases which had recently occurred in his own clinique and practice. The question of treatment was then fully discussed. Arsenic in the form of Fowler's solution was the drug for choice, and it should be given in increasing doses until the limit, which varies with each patient, is reached; thereafter it should be administered at two-thirds of the maximum dose attained. After the patient is better, arsenic should be withheld.

Professor Stalker moved a vote of thanks to Dr. Gulland, and Dr. J. Mackie Whyte seconded.

A MEETING was held in Dundee on 7th November. Dr. J. S. Y. Rogers occupied the chair.

Mr. Don showed a case of *gastrectomy for large simple ulcer*. For seven years the patient, a man of middle age, had had severe pain, which was relieved by vomiting. There had been no hæmatemesis and no melæna. The ulcer, which was shown, had a diameter of one inch and a depth of half an inch, and was on the lesser curvature. Mr. Don also demonstrated a case of myeloma of the lower jaw, and read notes of a case of congenital permanent displacement of intestine into the pleural cavity in a girl of 19, who had symptoms pointing to a gastric ulcer.

Dr. J. Mackie Whyte brought a patient who had *spondylitis* and in whom a cervical rib on the left side had been discovered. From X-ray photographs the rib seemed to be about 2½ inches in length, and on its outer extremity there was a rounded knob from which a fibrous band could be felt to pass towards the sternum. The rib had caused the patient no discomfort. Dr. Whyte then referred to two cases of *spondylitis*, which are published on p. 533.

Mr. Greig concurred in the diagnoses of the two cases.

Professor Kynoch showed *specimens* of (1) tubal pregnancy terminating in tubal abortion; (2) fibroid of uterus with fibroids in the broad ligament, the latter fibroids being distinctly separated from the uterus; (3) pyosalpinx of tuberculous origin.

Mr. John Anderson exhibited two *enteroliths* which he had removed from a man of 39 who had complained of colic for 18 years. A tumour was palpable in the right iliac fossa. The enteroliths were found in the ileum, the smaller moving freely about 5 inches above the ileo-cæcal valve, the larger at the ileo-cæcal valve. The enteroliths consisted largely of phosphate of calcium.

Dr. F. M. Milne demonstrated the new *Hayem-Sahli Hemocytometer*.

Mr. Greig read a paper on cases of "*Congenital Torticollis*." Although wry-neck was regarded as a congenital condition in many cases, he had been unable to find any record of its transmission through three generations. In his series the maternal grandmother had left congenital torticollis. She was now long deceased, but a lantern-slide from a photograph showed the condition well. The mother, now aged 35, has left congenital torticollis. Her eldest child, aged 10, does not show the deformity, but a daughter of 7 and a boy, the fourth child, of 2 years, show left congenital torticollis. Radiographic examination showed no abnormality in the bones of the mother and the two

children. Mr. Greig discussed the theories of its origin, and said that the fact that it occurred in four individuals out of three generations, and that it was present on the left side, put coincidence out of the question. Mr. Greig also showed a photograph of a case of *congenital cutaneous outgrowth* in a woman of 25. It was situated in the neck, and had been removed without difficulty.

RECENT LITERATURE.

CRITICAL SUMMARIES AND ABSTRACTS.

NEUROLOGY.

By EDWIN BRAMWELL, M.B., F.R.C.P.(Edin. and Lond.),
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PROGRESSIVE LENTICULAR DEGENERATION.

UNDER the title "Progressive Lenticular Degeneration: a Familial Disease Associated with Cirrhosis of the Liver," S. A. K. Wilson (*Brain*, 1912, p. 295) describes a new disease characterised by strikingly distinctive clinical and pathological features. The picture presented in this elaborate paper has been drawn from six cases collected by the author from the literature and reported by Gowers, Ormerod, and Homén respectively from four cases personally observed by him, three of which were examined pathologically in an exhaustive manner, and from the unpublished records of two further cases.

Progressive lenticular degeneration is defined as "a disease which occurs in young people which is often familial but not congenital or hereditary. It is essentially and chiefly a disease of the extra-pyramidal motor system, and is characterised by involuntary movements usually of the nature of tremor, dysarthria, dysphagia, muscular weakness, spasticity and contractures, with progressive emaciation. With these may be associated emotionalism and symptoms of a mental nature. It is progressive, and after a longer or shorter period fatal. Pathologically it is characterised predominantly by bilateral degeneration of the lenticular nucleus, and in addition cirrhosis of the liver is constantly found, the latter morbid condition rarely, if ever, giving rise to symptoms during the life of the patient."

The following is a more detailed account of the salient features of the disease as depicted by Wilson in his admirable monograph from a study of the twelve cases above referred to:—

Etiology.—The average age at onset was 15, the youngest patient being 10, the eldest 26. Seven of the cases were males and 5 females. In no case was there a definite history of a neuropathic heredity, although 8 were familial cases—in two instances three, in one other

two—belonging to the same fraternity. Race appears to be of no importance. There was no evidence of syphilis, alcohol, or other predisposing cause, while exciting causes were uniformly absent.

Symptomatology.—Three cases may be referred to as acute or sub-acute, terminating fatally in from four to thirteen months with a high irregular temperature and rapid emaciation. The remaining nine ran a more chronic course.

Involuntary movements and tremor were striking features. The tremor, which was one of the earliest symptoms, and was usually found at the outset, was rhythmical, and varied in rate from five to eight per second. It was increased by excitement and by voluntary effort. In some cases tonic or clonic spasms were observed. Spasticity was noted in all the cases, the only muscles escaping being the intrinsic muscles of the eye. The face was fixed and expressionless. In most cases the flexor muscles were predominantly hypertrophied. Contractures were a constant feature. Dysarthria and dysphagia were present in every case, and in the advanced stages there was more or less complete anarthria. Muscular weakness was present, but even in the later stages a considerable degree of voluntary power remained, *e.g.* a patient whose appearance suggested complete spastic paralysis was able to walk. Sensory symptoms, apart from occasional pains, were absent. The tendon jerks were unaltered. The plantar reflexes were of the flexor type. Impairment of the organic reflexes sometimes occurred towards the end, but it is doubtful to what extent this may not have been attributable to the patient's mental state. Mental impairment was noted in at least 8 of the 12 cases. This would appear to take the form of an inability on the part of the patient to "add much to his store of mental images, while his capacity for retaining impressions is impaired." A degree of facility, docility, and childishness was noted in advancing cases. The optic discs were normal, as were the pupillary reactions. There was no nystagmus. The palate moved on phonation and reflexly. There was no fibrillation or localised amyotrophy: there were no cerebellar symptoms: there was no impairment of sensibility. The reflexes were not those of pyramidal disease.

Pathology.—Ten of the cases were examined after death, and in seven of these symmetrical bilateral lenticular degeneration was found. Of the other three cases one was not examined microscopically, while in the remaining two the condition of the corpus striatum was not specially referred to. The striking feature is the limitation of the changes to the lenticular nuclei. In the majority of cases there have been changes obvious to the naked eye. Thus the lenticular nucleus may appear discoloured or spongy, atrophied or completely disintegrated and excavated. Microscopically the change is seen to consist of glial overgrowth, the glia tending to disintegrate and break down.

There are no signs of obliterative endarteritis or other pathological processes in the walls of the blood-vessels. The liver is always in an advanced state of cirrhosis. The cirrhosis is more or less multilobular, but in some places monolobular. In several of the cases the spleen is reported to have been enlarged, while regressive and proliferative changes have been found in the thyroid gland.

The nature and pathogenesis of the disease offer problems of engrossing interest. Wilson is of opinion that the morbid agent is probably of the nature of a toxin, which toxin is probably associated with the hepatic cirrhosis and generated in connection with it. The toxin must have a selective action.

Diagnosis.—This seems to present no difficulty to one who is familiar with the clinical picture. Pseudobulbar palsy alone perhaps calls for special notice. It is indeed conceivable that the pathological process may actually implicate the genu of the internal capsule on either side, and so produce pseudobulbar symptoms. In the typical pseudobulbar cases the palate and tongue are paralysed, whereas in this affection movement occurs. Again, in pseudobulbar palsy there are usually symptoms indicative of a double hemiplegia, with the alterations in the reflexes met with in affections of the pyramidal tracts.

Duration and Progress.—The disease runs a progressive course. In 3 cases death occurred in four, six, and fifteen months respectively. The shortest of the chronic cases lasted two and a half years, and the longest seven years.

MYOTONIA.

Myotonia congenita, a very rare disease, was first described by Thomsen, himself a sufferer from it, in 1876. Little has been added to our knowledge of Thomsen's disease, as it is now generally termed, during the past thirty-five years. The only cases reported in this country are those recorded by Buzzard, Hale White, Dreschfeld, and Risien Russell. Wardrop Griffith (*Quart. Journ. of Med.*, January 1912, p. 229) describes in detail the clinical histories of two new cases, and refers to some interesting observations he has made in relation to the myotonic condition of the muscles. As is well known, the striking clinical feature of the disease is this myotonic state, which is characterised by a tonic contraction which prohibits the relaxation of the voluntary muscles when they are first brought into action, the retarding influence soon passing off if the movements are persisted in. Griffith found that when the patient's muscles were in a state of very complete relaxation, secured by lengthened repose, passive movements of the limbs carried out with great gentleness did not result in the muscles becoming rigid. Again he observed that there was a distinct difference as regards the myotonia, according as the voluntary effort was prolonged or brief. When, for instance, the patient closed his

hand firmly, no matter how short that voluntary effort might be, it required as a rule fifteen seconds for extension of the fingers and hand to be completely effected. After the first closure of the hand succeeding closures were followed by more and more rapidly carried out acts of extension, until the movements became normal in every respect. When, however, the patient was directed to grasp with his hand firmly and keep it tightly closed for some time it was found that extension could then be effected as rapidly as in a normal individual. As the result of many observations it was found that if the firm contraction was kept up for fifteen seconds the act of extension could be carried out normally. The same observations were noted in the case of most of the muscles and movements of the body, and, generally speaking, with similar results. The finer movements of the hands and fingers and the interossei muscles were shown to be affected contrary to the statements of some writers. The muscles of the eyeballs were not involved, but the levator palpebrae presented the myotonic phenomenon. Thus when the patient was asked to look forcibly upwards and then downwards it was noticed that the upper lid did not follow the eyeball in its descent. It is of interest to note that although the latissimus dorsi muscle was thrown into brief but strong contraction by getting the patient forcibly to adduct the arm it became stiff like the other muscles of the body, but when the patient coughed it was noticed that the contraction associated with this act was not followed by any undue prominence of the muscle.

"Myotonia Atrophica and Hypertrophica" is the descriptive title which Griffith applies to a third case reported in this communication.

The patient, a man of 48, had a vacant expression. He had complained recently of diplopia, although no weakness of the ocular muscles was detected at the time of examination. The levator palpebrae exhibited the myotonic phenomenon above referred to. Mastication was weak, and the relaxation of the masseters and temporals slow. There was some difficulty in swallowing, and the patient could not protrude the tongue beyond the teeth. Speech was slow and indistinct. The vocal cords were in the cadaveric position. Both sternomastoids were greatly wasted. There was no wasting of the other muscles of the shoulder or upper arm. There was well-marked wrist-drop, with wasting of muscles on the back of the forearm. On grasping with the hand there was a general contraction of all the muscles of the forearm, with slow relaxation, which appeared to be more rapid when the patient ceased to grasp than when he exerted a powerful muscular effort in so doing. In some of the muscles the faradic excitability was diminished, while in all the contractions obtained on faradic stimulation remained for some few seconds after the cessation of the stimulus. Dorsiflexion of the foot was poorly carried out; plantar flexion against resistance was followed by a

lasting contraction of the calf muscles. The calves were exceptionally large, measuring $14\frac{1}{2}$ inches. The reflexes were normal. There was no disturbance of sensation. Curious attacks occurred while the patient was under observation. These were preceded by a peculiar feeling in the lower part of the neck, which passed upwards. The arms were then shot out from the sides and the legs extended, the condition lasting a few seconds. Consciousness was not impaired in these attacks. The pulse-rate was usually slow, falling on more than one occasion to 40 per minute. There was no heart block. Pieces of muscles were removed for histological examination. Many of the muscular fibres were found to be greatly increased in diameter. In the affected forearm many of the fibres were almost circular in outline. There was, too, a pronounced increase in the number of nuclei within the muscle fibres. To sum up, this patient presented in addition to the myotonic condition of many of the muscles an atrophic palsy, the distribution of the muscular wasting and notably the pronounced atrophy of the sternomastoids bringing it into line with some of the cases reported by Batten and Gibb (*Brain*, vol. xxxii. p. 187) under the name of "Myotonia Atrophica," as originally suggested by Rossolimo. Batten and Gibb take up the position that the feature of the atrophy in some of these cases is similar to that met with in the myopathies. They suggest "the possibility of there existing a form of myopathy differentiated clinically from the classical types as much by the distribution of the wasting as by the presence of myotonia." The abstractor some months ago demonstrated at a meeting of the Medico-Chirurgical Society a case of myotonia atrophica in which the infraspinati muscles were abnormally well developed, and indicated that in his opinion this observation afforded support to the view advanced by Batten and Gibb. So far as he is aware this case reported by Wardrop Griffith, a case described by Godwin Greenfield (*Proc. of Neurol. and Psychiat.*, 1911, p. 171) in which the infraspinati were said to have been "unduly prominent," and the personal observation above referred to are the only instances in the literature in which myotonia, muscular atrophy, and hypertrophy have been associated.

SURGERY.

By J. W. STRUTHERS, F.R.C.S.,
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DEVELOPMENTAL ADHESIONS AFFECTING THE LOWER END OF THE ILEUM AND THE COLON.

IN a paper with the above title (Aberdeen, The University Press) Gray and Anderson illustrate and discuss the origin, symptoms, and treat-

ment of the conditions termed (1) Lane's terminal ileal kink, described by Arbutnot Lane, and regarded by him as an important feature of the conditions associated with intestinal stasis in its varied manifestations; (2) Jackson's membrane, the thin vascularised peritoneal membrane often found crossing the ascending colon, and binding down and kinking that portion of the intestine more or less firmly; (3) splenic kink or Payr's disease, due to a short phrenico-colic ligament, with adhesion between the transverse and descending colon; (4) lower sigmoid or meso-sigmoid adhesions in the form of bands fixing the sigmoid or meso-sigmoid to the left iliac fossa.

Gray and Anderson believe that all these conditions have a common origin, in so far as they are primarily developmental, being due, as they put it, to "excess of physiological fusion," as the attachments of the various parts of the alimentary canal to the abdominal wall are formed during development. They reject Lane's view of their formation and the idea that they are primarily inflammatory in origin. They maintain that if Lane's view that the adhesions represent crystallisation of lines of strain were correct, the adhesions should be found in the upper layers of the mesentery and meso-sigmoid, on which strain would act most strongly. Further, in many cases the ileal membrane said by Lane to be due to the strain caused by a dropped cæcum has been present where there was no ptosis of the cæcum at all. They cannot accept the view often advanced that Jackson's pericolic membrane is inflammatory in origin, because of the astonishingly regular anatomical character of the best examples. The linear distribution of its vessels is quite unlike the radiating arrangement of the vessels in adhesions due to inflammation. The fact that many of the best marked cases have not been associated with symptoms, local or general, either as cause or effect, is regarded as additional evidence of their congenital origin, while the occurrence of several cases in children under five years of age lends additional support to this view. Gray and Anderson regard Jackson's membrane simply as an unusual arrangement of the right margin of the great omentum, with which it often has an uninterrupted connection. It is not possible in an abstract to give in greater detail the evidence brought forward, but the view taken by the writers has much to support it, and certainly appears to give a much more rational explanation of the conditions named than the views advanced by others. An interesting suggestion made is that these adhesions or abnormal fusions have much to do with the production of viscerop-tosis.

In describing the symptoms produced in some cases by the adhesions the authors differentiate between those of a chronic and those of an acute type. The chronic symptoms are general and local, the general being those of auto-intoxication, staining of the skin, excessive sweating, enfeebled circulation with cold extremities, slightly swinging temperature, loss of flesh, dulling of mental faculties, headache, painful

joints, cystic degeneration of the mamma, which is liable to be followed by cancer: the local symptoms being a distended heavy feeling in the abdomen, with twinges of pain and borborygmi, relieved or intensified by changes of posture, and constipation in varying degree. A bismuth meal may be seen to be delayed or arrested where the adhesions are most marked. The acute symptoms are similar in character but more intense, pain of a dragging character, with colicky exacerbations and tenderness over the affected part, being present, while signs indicating complete intestinal obstruction may develop.

The treatment consists in the free division of the adhesions, great care being taken to avoid leaving raw surfaces likely to lead to the formation of fresh adhesions. Several illustrative cases are described, and the operative methods employed in remedying the conditions found are explained.

The authors state that all their patients have been relieved of pain and most of them have regained normal health. Finally, they state that their paper has been written with the objects of elucidating the etiology of the conditions named and of stemming what is apparently a growing impression, that exclusion of the colon by ileo-proctostomy, or even actual removal of the colon, are the operations of choice in the treatment of these cases.

ANÆSTHETISING THE BRACHIAL PLEXUS.

Kulenkampff (*Beitr. z. klin. Chirurg.*, Bd. lxxix. Heft 3) describes in detail the method adopted in Braun's clinique for producing analgesia in the distribution of the brachial plexus. In doing so he emphasises the fact that it requires no very special knowledge to carry it out. With a little practice and attention to detail anyone may get satisfactory results. The solution used is a 2 per cent. novocain in saline, with 3 or 4 drops of a $\frac{1}{1000}$ solution of suprarenin added to each ounce of novocain solution made up. Of this 20 c.cm. are injected. The syringe used should be fitted with an easily adapted needle 6 cm. ($2\frac{1}{4}$ ins.) long.

In making the injection it is well to place the patient sitting upright on a chair, with a good support for the head, as the palpation of the parts and the direction of the needle can be better controlled in this position. The pulsating subclavian artery is first palpated above the clavicle and a cutaneous wheal of novocain made immediately outside this, *i.e.*, just above the middle of the clavicle. Light backward and inward pressure on this wheal reveals the resistance imparted by the first rib, and the cords of the plexus can often be felt on the rib under the finger. The needle is then entered through the wheal in the skin and pushed on towards the nerve cords as they lie on the rib. When the needle strikes one of the nerves a tingling sensation is felt in its

distribution, and the syringe should then be carefully attached and the injection made. Twenty cubic centimetres should be injected and distributed directly in or on the nerves if success is to be obtained. If the cords are missed, as indicated by the absence of any radiating twinge as the needle travels, the needle should be gently and slightly moved back and forward till a nerve is struck, for if injection is made without definite knowledge that it is in the right place, failure to produce analgesia is almost certain.

When the solution has been properly distributed, analgesia of the upper limb, up to a handsbreadth above the elbow, follows in about 8 to 10 minutes and lasts $1\frac{1}{2}$ to 2 hours. It is often accompanied by motor paralysis, complete or partial.

The results obtained in the first 100 cases in which the method was tried showed 77 successes, 4 complete failures, and 19 cases in which analgesia was not complete but sufficed for the performance of the operations done, except in a few cases where a little ether was given to finish the operations. It should be noted that these results were obtained without the use of general sedatives, such as morphia, scopolamin, etc.

LOCAL ANÆSTHESIA IN THE PELVIS.

Franke and Posner (*Archiv. f. klin. Chirurg.*, Bd. xcix. Heft 1) describe a method successfully used in Wilms' clinique for producing analgesia for perineal prostatectomy, etc. Their plan, which was first worked out on the cadaver, using coloured solutions, is as follows:—A 1 per cent. novocain solution, without adrenalin, is used. From a point 2 to 3 cm. from the middle line, just in front of the anus, a needle 12 to 15 cm. long is entered and pushed on in the long axis of the trunk, with the patient in the lithotomy position, till the resistance imparted by the levator ani muscle is felt. With a finger in the rectum the ischial spine is felt, and the needle pushed on under its guidance till it strikes the pelvic aspect of the ischial spine. By withdrawing the needle a little, depressing its point, and again pushing it on for 2 to 3 cm., it comes to lie just on the outer aspect of the ischial spine, and if 10 to 15 c.cm. of solution are injected there, the internal pudic nerve will be paralysed. This manœuvre is repeated on the other side, and the needle is then pushed up in the mid-line between the rectum and the prostate and 10 to 15 c.cm. of solution distributed in the connective tissue between the base of the bladder, the prostate and the rectum. As the needle travels to its various destinations small quantities of novocain may be injected on the way. Finally, the subcutaneous tissue is infiltrated from the ischial tuberosity forwards for 7 to 10 cm. on each side. By this means analgesia of the lower rectum, the anus, perineum, scrotum, penis, urethra, bladder, and prostate can be attained, and is usually complete 15 minutes after the

injections have been made. The method has been used with success, more especially in doing perineal prostatectomy by Wilm's method.

INTRAVENOUS ETHER NARCOSIS.

Within the last year or two the intravenous injection of ether in saline solution has been extensively used for inducing anaesthesia. Most of the reports have been favourable. Beresnegowsky (*Archiv. f. klin. Chirurg.*, Bd. xcix., Heft 1) has investigated the subject clinically in man and experimentally in animals and has not formed a favourable impression of the results. In comparing the method with inhalation anaesthesia he formulates the following conclusions:—(1) The ether solution has a markedly irritating effect on the walls of the vessels, thereby frequently causing venous thrombosis. This may be followed by pulmonary embolism. (2) The solution produces decidedly bad effects on the lung tissues, dilatation of the vessels, swelling of the tissues, areas with rupture of capillary vessels, with hepatisation of the lung tissue due to the escape of blood. (3) The changes in the kidneys and ganglion cells of the heart are similar to those following inhalation anaesthesia. (4) Exact dosage, as claimed by Burkhardt, is hardly possible, because ether is quickly given off in the lungs from the solution. The author considers that intravenous ether administration is only to be employed under certain special indications, as in operating about the head and neck, and believes that in dealing with anæmic and weakly patients it is wiser to give the anaesthetic by inhalation and simultaneously introduce physiological salt solution into a vein if necessary.

STRENGTHENING THE SUTURE OF THE KIDNEY PELVIS IN PYELO-LITHOTOMY BY A FLAP FROM THE FIBROUS CAPSULE.

Many operators prefer to split the kidney substance rather than cut the wall of the pelvis to gain access to a stone, on the ground that splitting the kidney is less likely to be followed by persistent urinary fistula. Payr (*Zentrabl. f. Chirurg.*, No. 44, 1912) believes that the liability to fistula after pyelo-lithotomy has been exaggerated, while the risks of nephro-lithotomy have been underestimated. Splitting the kidney may be attended or followed by severe bleeding, sometimes requiring removal of the kidney, while the necessary stitching often results in damage to the kidney substance, with subsequent functional inefficiency. Payr finds that in the great majority of cases suture of the pelvis is followed by primary union, and suggests that a certain number of fistulae in the past have been caused by a stone left behind in the ureter. Thanks to improvements in radiography we are now in a position to rely on it for demonstrating the number

and site of stones in the kidney and ureter. Payr urges that incisions in the pelvis should be more often used, and describes a method in which a longitudinal incision is made in the pelvis and closed after removal of the stone or stones by a double row of stitches. Following this a rectangular flap is cut from the fibrous capsule of the kidney, with its attached base towards the pelvis, turned forward over the suture line, and carefully stitched in position over it. In his hands this method has given excellent results.

THE RESULTS OF LIGATION OF ONE URETER.

It is currently believed that sudden obliteration of one ureter by ligation results in arrested secretion of urine and atrophy in the kidney affected, with no other ill result if the other kidney be sound. Simple ligation of the ureter has even been used for the cure of urinary fistula in the human subject. Frank and Baldauf (*Ann. of Surg.*, September 1912) have carried out a series of experiments on dogs to find out exactly what happens when a ureter is tied. They have found that ligation of a ureter is followed by a primary hydronephrosis, which results in ultimate destruction of kidney function as a result of pressure atrophy in the secreting tubules. Not infrequently, however, infection and suppuration of the kidney may follow, the infection reaching the kidney by the blood-stream. The resulting pyelo- and pyo-nephrosis leads to the complete destruction of the kidney, and in addition embolic septic processes, originating in the kidney, may ensue. They conclude from their experiments that in from 10 to 15 per cent. of cases such gross and extensive changes take place as would require further surgical intervention in man. In 80 to 90 per cent. of cases atrophy takes place without the development of conditions likely to require operative treatment

OBSTETRICS AND GYNECOLOGY.

By J. W. BALLANTYNE, M.D., F.R.C.P.,

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GENITAL TUBERCULOSIS.

PROFESSOR MAURICE PATEL (*Ann. de gynec. et d'obst.*, pp. 331-350, 427-439, Juin, Juillet 1912) has made a timely contribution to our knowledge of tuberculosis as it affects the female generative organs. Any one of these organs may be the seat of tubercular processes, from the vulva externally to the ovaries internally; but cases in which the vulva, vagina, and uterus are attacked are less common than those in which the uterine annexa (tubes and ovaries) are the parts affected.

Vulvar tuberculosis takes either the ulcerative form (the more common) or the vegetative (hypertrophic, elephantiac), and the treatment depends largely on the general state of the patient. If the ulceration is simply a complication of visceral tuberculosis (pulmonary, intestinal, or annexial), then treatment will consist simply of cauterisation with lactic acid or iodoform applications: but if the vulvar lesions exist alone, more radical means, such as curettage and the cautery (with general anaesthesia), are indicated, and extirpation of the masses in the vegetative form. Primary tuberculosis of the vagina is very rare, but it calls for the same treatment: fistulae, when present, need to be incised. Four forms of tuberculosis of the cervix uteri may come under observation—the miliary, the papillary, the ulcerative (most frequent), and the interstitial: and there is often tuberculosis also of the annexa or of the vagina. Radical operations (vaginal or abdominal hysterectomy) are not always indicated, and should be performed only in the diffuse form, or in cases of return of the disease after local treatment. Cauterisation, curettage, or (best of all) high amputation of the cervix with the thermo-cautery constitute the conservative surgery of cervical tuberculosis: and such treatment is indicated when the tubercular nature of the process has been clearly recognised, and when it is seen to be limited in extent to the cervix. There is considerable difference of opinion as to tuberculosis of the body of the uterus: it is certainly very rare as a localised lesion, and usually is only an incident in an advancing annexial or vaginal tubercular affection, the uterine mucous membrane standing, as it were, at the cross-roads between the descending and ascending routes of infection and becoming secondarily infected. A fibroid tumour of the uterus may become involved in the tubercular process, as may also a cancer. Poncet has given the name inflammatory tuberculosis to cases in which, although the tubercle bacillus is not found, the lesions are regarded as toxic. Most cases of tubercle of the body of the uterus are simply symptomatic of annexial tuberculosis, and treatment must necessarily be directed to the latter malady: of course local symptoms (metrorrhagia or pyometra) will lead to exploration of the uterus and curettage, and the diagnostic means may suffice also for treatment: the existence of an infected fibroid will call for hysterectomy: and vaccine treatment has been successful in the hands of Hollos in cases of inflammatory tuberculosis (the toxic type).

Annexial tuberculosis is, however, the most important manifestation of genital tubercle: indeed Faure has summarised the matter very well by saying that in practice genital tuberculosis in women means tuberculosis of the uterine annexa (tubes and ovaries). There are three chief forms, that in which the tubal lesions are the most important feature, that in which the peritoneum is most affected, and that in which the ovarian lesions predominate. There are also sub-

varieties: thus the first form or type may be of the nature of tubercular salpingitis, or of cold tubal abscess, or of hydrosalpinx or catarrhal salpingitis (attenuated forms): the second form has an ascitic type, an adherent plastic type, a suppurative and a vegetative type: whilst the third form embraces tubercular ovaritis proper, hypertrophic tuberculoma (of Tédénat), tubercular cysts of the ovary, and ovarian tumours of the ovary associated with tubercular lesions (Glockner and others). All these forms may have complications: these are peritoneal involvement: the bursting of tubercular abscesses into intestine, bladder, vagina, ureter, a hernial canal, or on the skin surface; or the presence of an ectopic pregnancy.

Other diseases of the genital organs may co-exist with annexial tuberculosis, *e.g.*, fibroid tumours of the uterus, cancer of the cervix, and fibroma of the ovary have been found alongside of tubercular salpingitis. Reference may here be made to Dr. J. Vanverts' case of epithelioma of the uterus, associated with tubal tuberculosis, which has recently been reported (*L'Echo méd. du Nord*, vii. 369, August 1912). The patient was 42 years of age, and had had three confinements, the last nearly twenty years before. She suffered from menorrhagia, pain on micturition and defaecation, loss of weight, and leucorrhœa, and there was a firm mass in the lower part of the abdomen. On vaginal examination Dr. Vanverts felt a cervix which gave the sensation as if affected with cancer, and thinking the abdominal mass to be also malignant in nature he did not recommend operation. The patient, however, desired to be operated upon, and laparotomy was performed, with the result that beyond removing the left tube the operator had to leave the parts as they were. When, however, the tube came to be examined microscopically, it was found to be the seat of tubercular processes. Further, the patient recovered well from the operation, and thereafter her general condition improved very markedly for some six or seven months. Taking these facts into consideration, Dr. Vanverts began to think that probably the uterine affection (corporeal and cervical) was likewise tubercular and not malignant, and he opened the abdomen for the second time. There were many and dense adhesions, necessitating a long and difficult dissection, and in the end some of the disease had to be left. The patient died soon afterwards, and the examination of the uterus showed it to be the seat of cancer and not of tuberculosis. These associations of two different pathological states in the same organ or in neighbouring organs constitute very difficult problems for the diagnostician and the operator.

To return to Professor Patel's articles, the treatment of annexial tuberculosis may be either medical or surgical. The former includes general and local means, and amongst the general means, hygiene, diet, and cacodylate of soda (*per rectum* or subcutaneously) may be

named: tuberculin has given good results in some hands. Local means exist in thermotherapy, heliotherapy, and the giving of rest to the reproductive system in every way (*e.g.*, avoidance of sexual intercourse). More important, much more important than the medical means, are the surgical ones, and these include operations by the vagina and operations by the abdomen. Professor Patel is but little in favour of the vaginal route, whether the operation be a colpotomy, a conservative intervention such as unilateral salpingectomy, or a radical one such as vaginal hysterectomy: he thinks this mode of approach gives little room and light where much is needed, and should be reserved for the small number of cases in which the lesions are very limited in extent and little adherent, or in which there are prominent collections of pus in the pouch of Douglas. Far more generally applicable and useful is the abdominal route, and various operations have been performed for annexial tuberculosis. Sometimes nothing more than opening the abdomen has been done, either in cases of ascites without grave tubal lesions, or in cases in which the lesions were so extended as to be irremovable. In other instances, such conservative procedures as unilateral castration, double salpingectomy, or double annexectomy have been done. But in the great majority of instances a radical plan has been followed—either total or subtotal hysterectomy—and Professor Patel prefers the former, adding the statement that Pfannenstiel's incision has not the same advantages here as in some other operations.

There is no doubt that surgical interference is justified in annexial tuberculosis. In Olivier's list of 116 cases done in Lyons there was an operative mortality of 9 or 7·75 per cent., a later mortality of 8 or 6·8 per cent., whilst 99 patients (about 85 per cent.) were alive more than a year afterwards, and a large proportion of them (73) were in a good condition. The precise indications for operation are difficult to fix, but it may be said that even the presence of another centre of tubercular infection is not necessarily a contra-indication, for the removal of the primary focus has been followed by retrocession of the secondary one. Practically the only local contra-indication is found in the presence of the signs and symptoms of acute peritonitis. Conservative operative procedures are justified in principle and in their results, and they ought to be more often practised. Unilateral castration or salpingectomy, for instance, has been followed not only by complete cure but also by subsequent pregnancies. Such operations are particularly indicated in young women in whom the lesions are clearly localised and limited. It is to be borne in mind that it is of little use to conserve the uterus and to remove both ovaries; one ovary should be retained if any advantage is to be gained.

Whilst much is to be said for the more conservative plans it has to be admitted that radical measures are most in favour at the present

time. The diffuse and vegetative forms constitute, however, a contra-indication. It is important to remember that the removal of the uterus simplifies instead of complicating the operation, by making it easier to reach and extirpate the affected tubes and ovaries. In the presence of complications, *e.g.*, intestinal fistula, special operative plans are required.

Somewhat similar conclusions to those of Patel were reached by Lapeyre (*Ann. di ostet. e gynec.*, xxxiv. 215, 1912), who emphasised the fact that in primary tuberculosis of the genital organs the great danger lay in the spreading of the morbid process to the whole peritoneum. Since this generalisation of the tubercular process is very rare when the vulva, vagina, and cervix uteri are affected, medical as well as surgical means may there be employed, but when the tuberculosis is found in the annexa and the uterus, then an extensive operation is indicated. In the last named class of case vaginal hysterectomy is to be completely abandoned as both insufficient and dangerous. The removal of the annexa of one side should be the exception, and the operation of election should be abdominal hysterectomy, either total or sub-total, whilst the advantage of drainage by the vagina makes Lapeyre prefer the former.

TUBERCULOSIS IN PREGNANCY.

Another important matter is the treatment to be adopted when pregnancy exists in a woman suffering from pulmonary tuberculosis. Dr. Jean Colombet deals with this difficult matter in a comprehensive manner (*Gaz. d. hôp.*, lxxxv. 1223, 1912). After referring to the views, often very divergent, which have been held regarding the influence of pregnancy on phthisis the writer admits that the resistance of the mother's organism to the tubercle bacilli is always reduced, although certain circumstances may mask the evil effects thereof, whilst others (renal complications of pregnancy) may exaggerate it. There seems to be no doubt that there frequently is aggravation of pulmonary tuberculosis in pregnancy, and especially at the time of labour and during the puerperium. It is better, therefore, to take the position of the pessimist than of the optimist, more especially as it is admittedly very difficult to form a correct prognosis regarding the tubercular lesion at the commencement of the pregnancy. On the other hand, pulmonary tuberculosis does not seem to interfere to any great extent with the progress of pregnancy, abortion (arising from the disease itself) being rare, and premature labour not being common save in the grave cases. The life and health values of the child, which is the product of a pregnancy in a tubercular woman, are more difficult to fix. Some authors, regarding the placenta as a powerful safeguard, think that the infant is born healthy, not

tubercular and not tuberculisable; but others (and they constitute the majority) regard the infant as either already infected or at least as in a condition which specially favours infection. The truth would seem to be that the infant at birth rarely contains tubercle bacilli in its tissues, but it is perhaps more prone to be attacked by them, and the surroundings are generally such as to bring it constantly into immediate touch with the infection. The statistics of the fate of the offspring of tuberculous mothers give very grave figures, whatever may be the exact mechanism by which the fatal results are produced. Of course if the infant can be taken from the mother as soon as born, removed to and brought up in the country, and given the best hygienic surroundings and a good milk supply it will very often do quite well, but it is very difficult to realise these conditions in actual practice and under the circumstances. There should be homes specially prepared for the reception and upbringing of such infants, more especially if they are also prematurely brought into the world.

But the most important problem is that of the treatment of the pregnant woman suffering from tuberculosis; it is complex and delicate, and is, further, in a stage of transition at the present time. Dr. Colombet refers to three plans of treatment, all of which find supporters. The *first* is the plan of abstention, and is specially the *French method*. Pregnancy is allowed to proceed to the full term, neither abortion nor premature labour being induced. The abstentionists regard the woman whose tubercular lesions are complicated with a pregnancy as doomed to a certain death; they therefore think it useless or prejudicial to terminate the pregnancy and kill the infant, and so they concentrate their efforts on saving the child. The *second* plan is that of inducing abortion, and it has sometimes been called the *German method*, although it was strongly advocated also by Duncan in London in 1890, and by Pasquali and others in 1886. It is advised that the pregnancy be interrupted in the first three months, it being understood that the patient has a form of tuberculosis which is susceptible of amelioration and of cure. The induction of premature labour is only to be regarded as a rare form of treatment to be used to save not the mother but the unborn infant in desperate cases; but some of this school go further and counsel the sterilisation of the patient as well as the interruption of her pregnancy. She ought not to be (according to Bunni's rules) a young woman, nor should she desire to have more children than she has; she ought not to have passed the fourth month, and she ought to be suffering from pulmonary lesions in process of development but capable of being checked. Sterilisation of a primipara is indicated only in very grave cases. The uterus, ovaries, and tubes may all be removed—a procedure which favours obesity and a consequent increased power of resistance.

Other obstetricians remove the uterus alone (total or sub-total hysterectomy) and leave the ovaries, and yet others perform temporary sterilisation by ligaturing or dividing the tubes, and others use the Röntgen rays for their effect on the ovaries. Professor Bar has recently proposed the removal of the pregnant uterus for another reason, viz., to extirpate the contained placenta with its tubercle bacilli and so prevent their passage into the blood at the time of confinement. The *third* plan has been called the *elective* one: in it the line of treatment varies with circumstances. Professor Voron of Lyons has attempted to define its limitations. Pregnancy is to be interrupted in the first three months, and in cases in which the phthisis is benign and curable: but, further, the tubercular lesions must be proven, not simply suspected, and the patient should be under observation for several days, all the known means of diagnosis should be employed, and the advice of a skilled physician should be obtained. In chronic cases in which the pulmonary lesions have cicatrised therapeutic induction of abortion is contra-indicated. When the obstetrician decides on inducing abortion he must explain clearly to the patient and her husband what it means, and obtain their written consent as well as the approbation of one or more consultants. The operation should be succeeded by proper medical treatment in a sanatorium or elsewhere, and the question of sterilisation should be settled upon only when pregnancy and phthisis appear to be henceforth quite incompatible. If the tubercular process be too far advanced to be benefited, the pregnancy should be continued under the best hygienic conditions, labour should be shortened by forceps, suckling should be forbidden, and the mother sent very soon to the country or put in a sanatorium. It need hardly be added that some of the plans advocated in France and Germany differ widely from those followed in Great Britain.

THERAPEUTICS.

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MODE OF ACTION OF PURGATIVES.

Infusion of Senna.—Magnus has shown that the laxative action of senna is solely an effect on the large bowel. He thinks that colon antiperistalsis is inhibited, and that in consequence of this—at least partly—the contents of the ileum containing senna on reaching the cæcum are soon evacuated. Magnus further characterises the action as a direct one on the wall of the cæcum and colon. These conclusions—drawn from observations made on the cat by X-rays—have been confirmed by Stierlin's observations on man. The stomach and small

intestine are not involved in the reaction to the drug. Forty-five minutes after the bismuth shadow is observed in the cæcum the contents traverse the whole length of the colon, and evacuation occurs. It is remarkable that the contents of the cæcum are very quickly passed on instead of remaining for the normal period of a few hours.

Meyer-Betz and Gebhardt have recently studied the action of infusion of senna in seven normal young men by the X ray method, and their conclusions confirm and amplify what has already been accepted by Magnus and Stierlin. The action of senna is limited to the large intestine, and the time occupied in the passage of the contents from the cæcum to the rectum is reduced to one or two hours. Hypermotility is evident in the cæcum, but the increase of motility is most marked in the transverse colon. The movements are not impetuous, as Stierlin assumed, but as soon as the hepatic flexure is reached a rounded mass is separated, and passes by a relatively quick uniform movement along the transverse colon, while behind it the same process is simultaneously beginning at the cæcum. The segregation occurs less frequently at the cæcum. In addition to the peristaltic mechanism of the colon there are other contractile movements, the effect of which is to mix the contents more thoroughly. This function, which was first demonstrated by Rieder, is directly demonstrable in favourable cases after the administration of senna. According to Meyer-Betz and Gebhardt it is wrong to assume, as Holzknrecht has done, that these smaller movements may block the peristaltic wave. The occurrence of these was observable only in the transverse and descending colon, but possibly similar though slower movements occur in the cæcum and ascending limb. Meyer-Betz and Gebhardt were unable to say whether these small movements participate in propelling the contents onwards. Senna appears to cause a simple increase of colon activity, and there is an entire absence of any indications of increased transudation or essentially diminished absorption. The cold infusion is an ideal stimulator of the colon, as it produces no disagreeable sensations or disturbance of the appetite.

Aloes.—The observations on the action of aloes did not give such uniform results as was the case with senna. One small dose usually failed to produce a reaction. Larger doses may act like senna, viz., by causing the cæcum and colon to empty very rapidly. As with senna, the stomach and small intestine do not participate in the reaction. The picture is one which bears a strong resemblance to spastic constipation. Segments of the colon in a condition of strong contraction alternate with others in which there are small rounded masses of contents. These masses accumulate gradually at the splenic flexure, and are then sent on their solitary journey to collect once more at the sigmoid flexure. In spite of the spastic contraction the contents may traverse the colon more rapidly than normally, but in

one or two experiments the contents remained stationary, although there was increased peristalsis. In these latter cases the spastic phenomena remained for hours, in fact until the observations ended. The authors believe these facts throw light on the practice of administering aloes in small repeated doses combined with belladonna, and explain the fact that aloes given alone in cases of spastic constipation is ineffectual.

Castor-Oil.—Magnus has shown that the neutral fat in castor-oil delays the emptying of the stomach. The laxative action of the oil depends on the liberation of ricinoleic and other fatty acids by the fat-splitting action of the pancreatic secretion. As these are in turn quickly absorbed the action on the bowel-wall is a short one, and does not lead to increased secretion. Magnus further observed no defecation reflex when the bowel contents reached the cæcum. According to this authority inhibition of antiperistalsis and consequent shortening of the period of transit in the colon is an open question. Meyer-Betz and Gebhardt have made eight observations on the action of castor-oil, and they hold, in opposition to the view of Magnus, that castor-oil acts on the whole gastro-intestinal canal, although they agree with him in regard to its retarding influence on the emptying of the stomach. In spite of the fact that vomiting occurred in one case, they could observe no increase of gastric peristalsis. The action on the small intestine is demonstrated most easily if the oil is administered when the small intestine is loaded. In the course of 3 to 4 hours after the administration the entire contents have passed into the colon. When the oil is given with food the action is slower, because it retards the emptying of the stomach and because the oil is necessarily less concentrated. Its action on the small intestine is, however, still shown by the evidence of increased peristalsis and by the formation of a precæcal convolution. The latter appears for a short time only, and the contents seem to pass into the colon earlier than is normally the case: the characteristic function of the cæcum is entirely absent, the contents remain fluid, the smaller contractions of the entire colon are languid or absent, and the gut becomes distended with flatus (or fluid?). The contents are passed on by the larger or peristaltic movements, and the colon may finally be entirely emptied at the first call. The fluid character of the contents probably explains this mechanism, and apparently there is a change in secretion or resorption. Meyer-Betz and Gebhardt thus differ from Magnus in one or two points, chiefly in regard to the action on the cæcum and colon.

Jalap.—The observations made by Meyer-Betz and Gebhardt agree in all essential points with those of Padtberg on the action of *colocynthis*. No decided influence was observed on the motility of the stomach, but the experiments were perhaps too few in number to determine this point. An increase of secretion in the small intestine was shown in

all cases by clearing up of the shadow and the distension of the loops, which appeared as broad, sausage-shaped shadows. There is also an increased rate of transit in the small bowel, best shown when the drug is given on a partially emptied stomach and filling small intestine. Three hours then suffice for complete emptying of the small intestine. The liquefaction of the contents is the most distinctive sign in the examination of the large bowel. The colon is distended with flatus and fluid in which the bismuth sediments, and thus in the transverse colon there is a tendency to the formation of two or three layers (the uppermost clear and the lowest most opaque). The transit in the colon is impetuous. Although this cannot be directly observed, evacuation occurs two hours after the bismuth is seen in the transverse colon. When the fluid contents are removed the *haustral* movements become obviously stronger. The subjective symptoms are pronounced, and soon after the drug is administered there is discomfort from colicky pains. The irritation of the bowel and the subjective phenomena are sufficient reason for the present-day hesitation in prescribing drastic purgatives.

Salines.—Given at a meal-time saline purgatives do not delay the emptying of the stomach, but in one of Meyer-Betz and Gebhardt's experiments, in which the salt was given during the course of gastric digestion, there occurred a definite lengthening of this phase. There is a marked increase of fluid in the small and large intestine, and the transit of the contents of the small intestine equals in rapidity that associated with the action of jalap. There is no special action on the præcoecal convolutions nor on the cæcum. The remaining part of the large intestine remains completely passive for lengthened periods during the inflow of fluid and flatus until the sudden onset of a powerful contraction drives the contents onwards. Defæcation may be delayed till long after the filling of the sigmoid, but may sometimes occur quickly, even so early as three hours after the administration of salts at a meal-time. As with jalap the action is especially intense if the salt is taken towards the close of gastric digestion. Should the colon be already loaded when the salts are administered its contents become more fluid, and evacuation of the fluid part may occur several times without advancing the more solid contents. Thereafter a more marked tonus around the solids is apparent, but these may remain an abnormally long time before being evacuated. Saline cathartics therefore, are not good evacuants, and their chief function is in stimulating a considerable secretion. They are indicated in cases in which before everything else it is desirable to remove fluid from the body. No essential difference in the action of magnesium sulphate and Carlsbad salts was seen. The former sometimes causes a greater secretion.

Calomel.—The action of calomel extends uniformly to the small and large intestine. The wall of the bowel in each case is definitely

stimulated to act in its characteristic manner. The contents of the small intestine are quickly moved along the coils, and in the large intestine the action is similar to that ascribed to senna. When calomel is given with a meal no increase of secretion appears to occur; the rapid transit alone sufficing to explain the semi-fluid consistence of the stools. If the calomel is given some hours after a meal, and thus acts in greater concentration, peristalsis is still more active, especially in the colon, and the stools are naturally more fluid. The total emptying of the bowel by calomel is very striking, and there would appear to be no better drug for this purpose were it not for the risk of absorption of the drug.

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MENTAL DISEASES.

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THE PATHOLOGY OF SENILE INSANITY.

AN important and very interesting paper has recently been written by Marinesco on the results of his examination of the brain in senile insanity (*L'Encéph.*, February 1912, p. 105). About 12 years ago Nissl expressed his belief that careful examination of the brain in cases of insanity would reveal a definite pathological change. He has himself done something to justify his belief, but it cannot be said that the goal, highly desirable though it is, has yet been reached. There have lately, however, been distinct steps towards reaching it, and in probably no other form of mental disease is this more true than in senile insanity. Research tends to show that this disease is not of one type only, but has several varieties, and that these are accompanied by different pathological alterations in the brain. Fischer named one variety presbyophrenia, and described a characteristic brain lesion. Alzheimer described another, associated with special changes in the nerve-cells of the cortex. Dupré and his pupils have drawn attention to the relations of presbyophrenia to Korsakoff's psychosis. Various other observers have recorded the results of careful examinations, and have apparently placed it beyond doubt that in many cases of senile insanity there is a characteristic cerebral lesion, which may now with considerable certainty be regarded as the pathological cause.

Marinesco first observed this lesion in 1892, and ever since he has been continuing his researches. The present paper is the outcome of

his most recent work. In his first observations he described the occurrence of numerous small round nodules (*plaques*) in the grey matter in various layers, and regarded them as neuroglial sclerosis. In 1907 Fischer also described these nodules, and definitely stated that they were lesions characteristic of presbyophrenia. In addition to these nodules he observed peculiar changes in the nerve fibres. He regarded the nodules as areas of necrosis, which induce proliferative changes on the part of the surrounding neurofibrils. He failed to find them in other than senile cases, and also found that they were not present in all senile cases. He therefore concluded that they were characteristic of one variety only of senile insanity, and that consequently the latter consisted of more than one group. Bonfiglio regarded the nodules as a formation round a necrosed ganglionic cell. Hübner considered the nodules to arise in relation to the blood-vessels. Other observers have investigated the condition and recorded their views as to its cause.

In describing his latest researches Marinesco draws attention at the outset to the variety of histological methods used by previous workers, and states that some of the divergent views expressed may be so explained. He describes his own in detail, and claims that they permit of the recognition of the changes in their earliest stages, and do not dissolve out nor affect any of the pathological products. The tissues are fixed in formalin and impregnated with silver nitrate, which is afterwards reduced by pyrogallie acid. For the neuroglia the methods of Merzbacher and Bielschowsky were used. Various aniline dyes, safranine, thionine, etc., may be used as differential stains for special purposes.

The clinical history of one case investigated by the author is given in short form. The patient was a woman of 54, who three years before had a paralytic stroke. Mental disturbance supervened in the form of verbal amnesia, word-blindness, agraphia, apraxia, and certain symptoms of asymbolia. At the post-mortem examination there was found a softening of the left optic thalamus, and smaller ones in the *corpus striatum*. In addition there was observed in the cerebral cortex a large number of the nodules already referred to. They were most numerous in the right occipital region, less so in the *cornu ammonis* and hippocampal convolution, in the frontal and temporal convolutions. They were not at all numerous in the left hemisphere, and were absent in the left *cornu ammonis*. There was no difference in their distribution over the summits of the convolutions compared with the base of the furrows. As regards their distribution in the various cortical layers, the order of frequency was 3rd, 5th, 2nd, 1st, and 6th. They were absent from the white matter. Their size varied from 16 μ . by 14 μ . to 80 μ . by 72 μ . They were rounded, oval, or ovoid in shape, but sometimes they were irregular. The larger ones have a very complex

structure, and require several methods to unravel. The modification of the Cajal method, which he adopted, was the most useful for studying the early formation of the nodules, and especially the fibrous elements. At first there are formed between the nerve-cells or close to them isolated rod-shaped bodies (*bâtonnets*). These then join together and form star-shaped masses. They gradually increase in size by the deposition on them of more rods. The nodules form in the neighbourhood of a nerve-cell or vessel, or may enclose one or other of these, and they also contain a number of nerve-fibres, of neuroglia fibres, neuroglia cells, or macrophages. In the larger-sized nodules there are three zones, a central nucleus, an intermediate, and an outer layer. The latter cuts off the nodules from the surrounding healthy tissue. The degree to which these zones are developed varies much in individual nodules. The dimensions of the layers are given for thirty different nodules. The central zone or nucleus is rounded in form, and may be single or multiple. In many instances it shows a fine acicular deposit on its surface, giving it a rayed appearance. By some this deposit has been regarded as of crystalline nature, but Marinesco does not agree with this. Besides these spicules there are also to be seen filaments uniting the central and outer layers, giving in some instances a wheel-like appearance. The presence of these nodules induces remarkable changes in the surrounding nervous and neuroglia elements. The former show degeneration, regeneration, and metamorphosis, due probably both to mechanical and to chemical action. The phenomena of regeneration play a most important part in the production of the changes seen. New nerve-fibres form and surround or penetrate the nodule. The author regards these changes as exactly analogous to what occurs in nerve regeneration after section. Changes also occur in the neuroglia, but they are not very marked. The walls of the arterioles become thickened and the lumen diminished. Round them great numbers of spider-cells can be seen. The nerve-cells, apart from excessive pigmentation, do not show much change. In the case of another patient, a woman over 100 years old, Marinesco found some peculiar alterations in neurofibrils of the cells, which he describes in some detail, but this, apparently, is not a constant change.

Discussing the nature of these various morbid appearances, the author admits that it is impossible to explain them satisfactorily. He cannot say of what the central part of the nodules consists; one can offer only conjectures. He does not think it is formed from either nerve or neuroglia cells. He considers that the substance which forms the rod-shaped bodies, the earliest stage in the formation of the nodules, is of colloidal nature, but different from that which forms amyloid bodies. It may be deposited as a result of disturbances of metabolism or disassimilation, it may belong to the class of mono-aminophosphatides or aminolipotides, but this is merely a speculation.

This very interesting paper, indicative of prolonged and careful work, is illustrated by four plates containing 18 figures showing the various conditions described in the text.

ON SOME PROBLEMS PRESENTED BY GENERAL PARALYSIS.

Dr. Macfie Campbell, in an instructive short paper (*Amer. Journ. of Ins.*, January 1912, p. 491), discusses some of the difficulties encountered in the correlation of focal symptoms of brain disease with the post-mortem findings in many cases of general paralysis. Everyone is familiar with cases of that disease who present symptoms which ordinarily would be taken as conclusive evidence of a local cerebral lesion. This is specially so with Jacksonian fits, localised paralyses, or anaesthesia and hemianopia. And yet when examined there may be no change to account for these very definite symptoms. Dr. Campbell records some cases in which a local lesion was found, but points out that in some of these the local lesion is irrelevant to the general paralysis, while in others it is based on a process which has a common origin with general paralysis, *e.g.*, endarteritis. He also records examples of cases by no means uncommon in which the diagnosis of general paralysis is possible only after microscopic examination of the brain, the usual naked-eye signs being absent. This is undoubtedly a matter of very great importance, and should always, if possible, be carried out in every doubtful case. Dr. Campbell further records some cases in which focal symptoms were present, which on microscopic examination revealed an unusual intensity of the disease process on that side of the brain in which the focus was diagnosed to be. He suggests the more careful examination microscopically of all such cases, and without doubt he is entirely right.

It is probably not too much to say that if the mental and physical symptoms in any individual case of general paralysis could be correlated to special pathological changes in particular regions of that person's brain, the problem of cerebral function would to a large extent be solved. This would certainly entail much careful and prolonged work, and possibly also the discovery of more refined histological and chemical methods, but it seems quite the most useful avenue to lead to this substantial advance in knowledge.

SERUM REACTION IN GENERAL PARALYSIS.

Drs. Eyman and O'Brien are continuing the work begun by the latter in investigating the *Bacillus paralyticans* of Ford Robertson, and report the latest results of their work (*Amer. Journ. of Ins.*, February 1912, p. 485). They followed the lines of the Wassermann reaction,

using as antigen the *Bacillus paralyticus* instead of the usual extract of syphilitic liver. By this method the results are somewhat similar to those found with Wassermann's reaction. With the blood of general paralytics the successful results came out as 90 per cent. In the wives of general paralytics 60 per cent. gave a positive reaction; prostitutes, 73 per cent. Their conclusion from these researches is that in this disease syphilis is not the only potent factor, but that there is also another special venereal infection distinct from syphilis concerned in its production.

CHEMISTRY OF NERVOUS AND MENTAL DISEASES.

Though there is as yet little definite knowledge of the chemical processes accompanying, or it may be causing, nervous and mental disease, signs are not wanting that investigations are being pushed to attain more exact and extended information in this important subject. All chemical investigation, even of inorganic substances, consumes much time and involves great skill and labour, and when organic materials are concerned, the time, skill, and labour are immensely greater. Dr. Barnes (*Amer. Journ. of Ins.*, January 1912, p. 431) gives a summary of present knowledge of the subject, and a very full bibliography. He has not much faith in many of the clinical investigations which have recently been published, as he considers they have been performed by persons unskilled in chemical methods, and conclusions have been drawn without knowledge of the pitfalls which lie ready to entrap those without the requisite experience. He discusses each of the best-known forms of mental disease, and states what he considers the ascertained facts to be from the chemical point of view in the light of his own experience and work. In dementia praecox there is evidence of the existence of an abnormality of metabolism, as shown by the departure from the normal in the amount of the neutral sulphur in the brain of such cases. The exact significance of this is, however, still uncertain. In manic-depressive insanity there are also evidences of some disturbance of metabolism. Several observers have recorded the presence of indicanuria, but whether this is a cause or a result of the brain disease is not yet clear. The connection between the two has still to be worked out.

In epilepsy many chemical investigations have been conducted. These show some metabolic disturbances, evidenced by alteration in the excretion of chlorides, uric acid, calcium, magnesium, and phosphorus. There is also an increase in the cholesterol in the cerebrospinal fluid. But the nature of these disturbances and their relation to the brain disease still awaits further investigation.

In general paralysis not one of the various agents suggested as causing the seizures can at present be held to do so. Further investi-

gation has robbed each one in turn of its pride of place. Negative knowledge, though undoubtedly often useful, is by no means satisfying, and for that reason alone further work will presumably be forthcoming.

Speaking generally it cannot be said that as yet chemistry has added any striking new facts to our knowledge of mental disease. It has only given indications that such facts await discovery, and that the process of eliciting them will be one involving the expenditure of an unusual amount of time and care, and will be attained only by those possessing a complete chemical training.

INJURY AND NERVOUS DISEASE.

In view of the existence of the Workmen's Compensation Act the importance of reliable evidence as to the effect of injury in the production of mental disease is very apparent. Any reliable information on this subject is therefore very welcome. Dr. Warrington relates his experience, and also refers to the general literature of the subject in an important paper (*Med. Chron.*, June 1911, p. 121). The only mental disease of which he writes is general paralysis. This, however, is the chief one in which the question of injury is likely to arise. Dr. Warrington quotes with approval Mott's opinion that it occurs only in the subjects of congenital or acquired syphilis. There is no doubt that the arguments in favour of this view become stronger with every advance in the knowledge of that disease. If such is a medical man's opinion the only question he has to answer in a compensation case is—Has the injury precipitated or accelerated the disease? Dr. Warrington concludes that to prove either of these it is necessary that the injury should be of considerable severity, causing distinct concussion or entailing prolonged confinement in bed. If the injury has been slight the mental shock must be severe, and shown by severe symptoms. The time interval between the injury and the first appearance of mental symptoms must not be too long—not over a year and a half. Post-traumatic dementia must be capable of being excluded. To facilitate this differential diagnosis the author gives the symptoms of general paralysis and of post-traumatic dementia as well as of cerebral syphilis, cerebral arterio-sclerosis, and alcoholic dementia with which general paralysis may be confounded. It will thus be seen that this paper is most helpful and informing.

GYMNASTICS IN THE TREATMENT OF PSYCHOMOTOR INSTABILITY.

Dr. Paul Boncéur (*Progrès Méd.*, 9th September 1911) advocates the use of rational gymnastic methods in the treatment of certain cases of mental defect in children in whom there are symptoms of motor restless-

ness or lassitude. He is the head of a medico-pedagogic institute, and speaks from his own experience of the benefits of such methods. Their essential feature, if they are to be successful, is that they make a constant appeal to the various senses, and insensibly train the faculty of attention. All automatism is severely banned, because there is then no appeal to the attention, and even though great physical benefit may result, the mental faculties are in no way stimulated, and this is the main object desired. To attain this result the exercises must be interesting, they must not be unduly prolonged, they must be changed at given signals which vary for different movements, and they are best carried out to the accompaniment of music. Changes of rate and rhythm can in this way easily be effected. In his experience great benefit may be derived both in training the elementary mental faculties and in educating the muscles in the performance of co-ordinated movements. As in other forms of education, and to an even greater degree in this, each pupil must be studied individually, and the exercises modified to suit the individual requirements. The onset of fatigue must be carefully looked for, and if possible avoided. He gives an outline of a number of exercises which, with the necessary intervals for rest, require half an hour. This, he thinks, is as long as it is desirable to give at one lesson.

THE ASEXUALISATION OF THE UNFIT.

As is well known, this subject has been publicly discussed in America to a much greater extent than has been the case here. Already four States—Indiana, California, Oregon, and Connecticut—have passed laws authorising such a procedure under due precautions. But for the action of the Governor of the State of Pennsylvania a similar law would now be in force there also. Dr. Barr, the chief physician of a State institution for mental defectives, pleads for the extension of such legislation, and gives his experience of the results of sterilisation in 200 cases (*Alienist and Neurol.*, February 1912, p. 1). He states that in every case marked improvement has resulted. This is, to say the least of it, rather remarkable, and more details of cases would be desirable. In his paper he makes no reference to the possible abuses that might result were such a law to become general. It will be interesting to observe what happens in those American States where it is now in force after it has been in operation for some years longer.

NEW BOOKS.

The Surgery of the Skull and Brain. By L. BATHE RAWLING, F.R.C.S.
Pp. 340. With 96 Illustrations. London: Henry Frowde and
Hodder & Stoughton. 1912. Price 25s.

THE author in his preface declares that, "I have realised to the full the difficulties of the task which I have undertaken, but have every confidence that they have been overcome." It appears almost superfluous, therefore, for us to say that, with certain reservations, we are inclined to agree with him.

The book is written in a clear and easy style, the photographs and diagrams are for the most part excellent and really useful, and the style in which the book has been printed and got up is beyond criticism.

In describing the technique of the operation of craniotomy the author recommends J. M. Cotterill's method of an oblique section of the bone to prevent subsequent sinking of the bony flap, but he retains the old method of cracking across the base of the flap, a plan which he admits is attended (as was pointed out some years ago by Cotterill) by considerable risk of tearing of the dura and the meningeal vessels. This difficulty can be and should be, surmounted by oblique section of the base of the bony flap, two directors being passed, the one between the bone and the dura, and the other parallel with the first, lying between the bone and the vessels in the base of the scalp flap. The bony flap can then be raised without any force whatever, and with no risk of injury to the subjacent parts.

We are of opinion that cases of cerebral abscess are best treated without the formation of an osteoplastic flap. The flap of dura mater is also best made with its base opposite the base of the bone flap.

The author recommends ventriculo-subdural drainage in cases of internal hydrocephalus, but admits that all forms of drain soon become blocked and ineffective. This has been our experience also, and we consequently prefer, in suitable cases, the method of approach and drainage by the cerebellar route.

He does not mention the treatment of such cases by ligature of the carotids, a method which has been followed by considerable success.

Mr. Rawling has elaborated a system for determining the exact line of basal fractures. It cannot be said that it appeals to us as convincing.

He is opposed to the use of lumbar puncture for the relief of intracranial pressure the result of hæmorrhage, preferring either venesection or decompression. In this opinion we entirely agree.

He has little belief in cerebellar decompression. It is, however, the only form of decompression which really relieves subtentorial tension,

and we believe that his opinion and his results would be favourably modified if he were to adopt the more thorough operation, which we have found both safe and effective, in which the posterior third of the circumference of the foramen magnum is removed together with a large part of the occipital bone.

Mr. Rawling recommends decompression as justifiable and often curative in cases not only of Jacksonian, but also of idiopathic, epilepsy.

On the whole we can cordially recommend the book.

Surgery of the Rectum for Practitioners. By Sir FREDERICK WALLIS, F.R.C.S. Pp. 355. London: Henry Frowde and Hodder & Stoughton. 1912. Price 15s.

THE diseases of the rectum and anus, whilst extremely common, probably get less attention from the medical student than the lesions of any other region of the body. As a result of this the diagnosis and treatment of rectal troubles by the average practitioner usually fall short of the standard of the rest of his work. This book would therefore serve a useful purpose did it do nothing but emphasise the importance of a careful physical examination in all rectal cases.

In the preface the author—whose untimely and lamented death occurred while the book was still in the press—states that the aim of this work is to “present the present-day surgery of the rectum in a practical and condensed form to young surgeons and practitioners.” This object has been successfully attained, for the important facts of rectal surgery are put forward in a clear, concise, and readable form. The subjects of rectal fissure and fistula are treated in an exhaustive and essentially practical manner.

In the chapter on the treatment of hæmorrhoids the author, after a very wide experience of the various operations now in use, expresses a preference for a slightly modified Whitehead's operation, especially in the case of patients who are profoundly anæmic. Stretching of the sphincter he pronounces unnecessary, and even harmful if practised vigorously. Attention is drawn to the occurrence of synovitis in various joints secondary to ulceration in the colon comparable to the arthritic complications of a gonococcal urethritis. Fibrous strictures of the rectum are stated to be always secondary to a simple inflammatory and never to a syphilitic condition.

The chapter on the treatment of cancer of the rectum is a particularly well-reasoned and impartial review of the merits of the various operations at present in vogue.

Numerous excellent and thoroughly descriptive illustrations greatly add to the value of a book which can be confidently recommended to all surgeons and practitioners.

The Essentials of Morbid Histology, for the Use of Students. By ALBERT S. GRUNBAUM, M.A., M.D., F.R.C.P.(Lond.), D.P.H. Pp. xvi. + 208. London: Longmans, Green & Co. 1912. Price 7s. 6d.

THE preface to this volume states that it follows the lines of Professor Schäfer's *Essentials of Histology*, and that it is intended to assist the teaching of "general" rather than "special" pathological anatomy; further, that no pretence to completeness is made or assumed.

The last statement, to a certain extent, disarms criticism, particularly as, before going far, the reader finds that the descriptions are somewhat sketchy as a rule, and would have to be considerably amplified and modified by a teacher of the subject.

The illustrations are for the most part well chosen, capably executed, and accurately reproduced, but some of the figures, for example those representing cloudy swelling of the liver and kidney, cell-nests in epithelioma, and syphilitic cirrhosis of the liver, might easily be improved: others are only fair: while several, for example those of acute yellow atrophy of the liver, chronic venous congestion of lung and of liver, lardaceous disease of the liver, incised wound, changes in the liver in phosphorus poisoning, and lobar pneumonia, are not good.

Several mistakes are noticeable in the legends attached to the illustrations, *e.g.* "erium" for "corium" in Fig. 24: "papilliferous" for "proliferous" in Fig. 114; "stratum granulosum" for "basal layer of stratum Malpighii" in Fig. 128.

We have space for only a few criticisms of the text. The description of cirrhosis of the liver is that which obtained currency ten years ago, and does not reflect the modern teaching as to the relationship of that condition to the acute and subacute yellow atrophies of the organ. We do not favour the use of "arteriosclerosis" and "atheroma" as equivalent terms. The order of the organs affected with lardaceous disease is given as "liver, spleen, kidney," whereas the general experience is that the kidney and spleen are more often affected than the liver. We cannot understand the following statements:—"Scar-tissue in contracting gradually cuts off the nutrition of the surrounding organ parenchyma," etc. (page 33), and page 95, in the description of the pneumoconioses, "from the lymphatics the particles may find their way into any part of the organ." We do not agree that "pus is a characteristic of the membrane in diphtheria" (p. 29). These are only samples of many statements to which we take exception.

The plan of the book is a good one, and we are somewhat disappointed that apparently exigencies of space have so greatly reduced the value of the text.

Pharmacology and Therapeutics. By HORATIO C. WOOD, Jr, M.D.
Pp. 429. Philadelphia: J. B. Lippincott Co. 1912. Price
18s. net.

A WAVE of criticism emanating from the United States of America is at present beating against the established order in matters of medical education. Doubtless this will have its value as a factor in the process of evolution, but it is hardly to be expected, or even desired, that the position arising from centuries of experience should be altogether submerged by the Atlantic flood.

The author of this work finds the old style of text-book on *materia medica* and therapeutics so fundamentally at variance with modern ideas, that it is almost impossible to make it conform to the needs of the present-day student. It has been his aim to put clearly before the student the relationship between pharmacological science and the clinical employment of drugs, but he is confronted with difficulty in the matter of classification. He considers that we are in a position to make a tentative classification of drugs on purely pharmacological grounds, but holds that such a classification is likely to lead to the disparagement of the ultimate purpose of the science—the increase in therapeutic accuracy. On the other hand, any clinical classification which does violence to the natural pharmacological grouping of drugs has the objection of adding to the student's burden. The author has attempted to devise a scheme which will emphasise both the pharmacological and clinical relations of drugs. We can hardly congratulate him on his success. The method of emphasising the therapeutic side appears to consist in the interpolation of a section on the treatment of acute bronchitis and cough and another on the treatment of chronic heart disease. The former occurs after a description of the expectorants and before the account of the sedatives. The treatment of chronic heart disease is taken up before we are informed regarding iron, arsenic, the iodides, or the cathartics. Squill and digitalis are not mentioned among the diuretics, and caffeine does not find a place among the drugs affecting the circulation. Under the heading "alkalies" we find an account of sodium, magnesium, calcium, and charcoal; and as "counter-irritants," mustard, cantharides, bismuth, and cerium oxalate are discussed. Apart from these vagaries the book contains a pleasantly-written and accurate account of pharmacology. The section on the thorny subject of alcohol is excellent. The present position of salvarsan is judiciously summed up. We find no reference to the formates—perhaps the best way of dealing with them—but colocynth is surely dismissed too cavalierly in the statement that it might be omitted from our armamentarium with no great loss.

The lists of preparations are those of the United States pharmacopœia.

Salvarsan in Syphilis and Allied Diseases. By J. E. R. M'DONAGH, F.R.C.S. Pp. 164. London: Henry Frowde and Hodder & Stoughton. 1912. Price 7s. 6d. net.

THIS book appears opportunely at a time when not only specialists in venereal disease but general practitioners are beginning to use salvarsan fairly extensively, and are, accordingly, anxious to obtain as much information regarding the drug as possible. To the latter we can confidently recommend Mr. M'Donagh's little work.

The author has now had a large experience in the use of "606," having been one of the earliest of British surgeons to employ it in a large number of cases. The whole subject is dealt with in a capable manner, and special chapters are devoted to such subjects as the technique of intravenous injection (the method of election according to the author), contra-indications, fatal cases, etc. At the end of the book the more recent preparation—Neo-Salvarsan—is as fully discussed as the short period in which it has been in the hands of the profession permits. Specially interesting are the author's opinions with regard to the necessity for repeated Wassermann tests and his caution not to mistake latent syphilis for cured syphilis after one or two injections. We are glad to see that Mr. M'Donagh advocates the use of mercury in addition to the arsenical treatment. We think, however, that the advantages of the use of the syringe in the intravenous method of introducing salvarsan are not so great as the author would have us believe.

Occasional Papers on the Prevention of Some Common Diseases in Childhood.

By J. SIM WALLACE, D.Sc., M.D., L.D.S. Pp. 103. London: Baillière, Tindall & Cox. 1912. Price 3s. 6d.

IN this book Dr. Sim Wallace has collected a series of papers and addresses on dietetics and kindred subjects, given by him during the past five years. The author is well known as the pioneer, and vigorous advocate of the view that dental caries is caused by an improperly chosen diet, and is preventible if certain detergent foods are included and attention is paid to the order of foods in the meals. We agree with his main position that modern dietaries both for children and adults err in the direction of over-refinement, and that this is directly and indirectly responsible for much dental decay, but at the same time we feel that he is at times apt to spoil a good case by exaggeration. He somewhat unfairly accuses the medical profession of preaching dogmatically what he calls "a sloppy diet" for young children, and he brings forward rather a scanty body of evidence in favour of his own decidedly dogmatic views as to the revolution that will be effected in the condition of the teeth after adoption of a corrected dietary. His schedule of forbidden foods, especially for children, is

a little alarming. Porridge is banned, and even milk he looks askance at, though milk is among foods one of the most effective stimulants of saliva. Nevertheless, we can recommend this small volume to the attention of medical men. Even if it will not produce complete conviction it will certainly provoke thought on the important subject of dietetics.

The Treatment of Short-sight. By Professor Dr. J. HIRSCHBERG, Berlin.
Translated by G. LINDSAY JOHNSON, M.D., F.R.C.S. Pp. 123.
London: Rebman, Ltd. 1912. Price 5s. net.

THE volume before us is a translation of Professor Hirschberg's lecture on the treatment of short-sight, which was first published some ten years ago in Professor v. Leyden's *German Clinic*.

The article, although including the current literature on the subject, is based entirely on the author's own exceptionally extensive experience, and is all the more interesting on that account.

The additions, however, to our knowledge on the treatment of myopia during the past decade have not been incorporated in the translation, but the work suffers very little on that account, for the additions during these years have confirmed rather than modified the fundamental propositions set forth in the lecture as originally delivered.

The unique experience of Professor Hirschberg, extending over several decades of uninterrupted ophthalmic practice, together with his marvellous powers of observation, has rendered this treatise of especial value not only to the student but also to the experienced ophthalmologist.

We know of no work which covers the ground so exhaustively and thoroughly, and we have pleasure in recommending its careful perusal to all those who are interested in this important subject.

To Dr. G. Lindsay Johnson, the translator, English readers must be greatly indebted for placing at their ready reach such an important work from the pen of one of the most erudite of living ophthalmologists.

Pathology of the Eye. By P. H. ADAMS, F.R.C.S., Surgeon to the Oxford Eye Hospital. Pp. 194. London: Henry Frowde and Hodder & Stoughton. 1919.

THIS book, one of the Oxford publications, is founded on a series of demonstrations prepared for those attending the course for the Diploma of Ophthalmology at Oxford University.

Chapter I. deals with practical pathology; the very numerous methods of fixing, embedding, and staining have been judiciously omitted, and only the simplest and most straightforward methods

given. Following this are chapters on the conjunctiva, cornea, iris, ciliary body, lens, retina, choroid, sclera, and optic disc. In these chapters the normal and pathological condition of each tissue is shortly but sufficiently discussed. Chapters on glaucoma and on general affections and the bacteriology of the eye complete the work.

The book is not intended to be an extensive treatise on the subject dealt with, but simply a convenient laboratory handbook. So far as it goes it is excellent, and the author is to be congratulated on supplying a most useful, reliable, and practical guide to the pathology of the eye.

It is with the utmost confidence that we recommend it to those engaged in teaching and laboratory work.

The First Signs of Insanity: Their Prevention and Treatment. By B. HOLLANDER, M.D. Pp. 336. London: Stanley Paul & Co. 1912. Price 10s. 6d.

ACCORDING to the preface of his book Dr. Hollander has written it with a view to enlightening all those interested in mental disease and its bearing on the life of the community from the social as well as the medical and legal aspects. In the first part of the book the normal mental powers and their development are described, and attention is particularly directed to the various ways in which these powers may be affected by disease. This is the most instructive part of the book from the point of view of its title. If mental disease is to be recognised early, it is necessary that the first departure of the mental powers from their normal activity should be observed. This, however, is by no means so easy to do as it might appear. The normal range of the mental faculties is so wide that there might be as much danger in attaching great importance to small departures from its ordinary working as in paying no heed to them at all. It is well that they should be observed, but the decision as to their importance can only be left with safety to the experienced physician.

In the second part the various causes of insanity are shortly dealt with. Heredity and drink come in for the largest share of attention, as they are bound to do in any treatise on this subject.

In the third part the prevention and treatment of mental disease are discussed. Much importance is given to the exercise of mental discipline as a preventive to insanity. This is as true as it is difficult to exercise, especially of late years, when discipline of any kind appears to be growing more and more difficult to apply, and resented when applied. Psycho-therapy, in the form of psycho-analysis and hypnotic suggestion, is touched on, and stated to be of considerable value. Mention is specially directed to the undoubted difficulty that exists in England in the treatment of early and unconfirmed cases in private

care. This has for some time been recognised by the medical profession, and repeated attempts have been made to introduce the procedure which has for many years prevailed in Scotland without untoward results, but hitherto these efforts have not met with success. It is to be hoped that this book may do something to remove the objections, mainly sentimental, which have stood in the way of progress. The preventive measures chiefly advocated at present for lessening the constant stream of insanity are very fully dealt with and some of their difficulties pointed out.

In the fourth part of the book a short description is given, as far as possible in non-technical language, of the various forms of insanity and feeble-mindedness at present recognised. In this section special reference is made to the way in which the mental faculties described in the first part are usually affected in the different kinds of mental disease. It is doubtful if this section will be of much value to any but the medical reader.

On the whole, Dr. Hollander has produced an interesting and instructive book. As was to be expected, many opinions are expressed which will not meet with universal acceptance. The conflict between medical and legal opinion in many of these matters is well known, and will probably exist for many years yet. The author has, however, stated his own views of many questions with plausibility and force.

Studies in Psychiatry. By Members of the New York Psychiatric Society. Pp. 222. New York. 1912. Price \$2.

Handbook of Mental Examination Methods. By SHEPHERD IVORY FRANZ, Ph.D. Pp. 165. New York. 1912. Price \$2.

THESE two books form numbers 9 and 10 of the useful and well-known Nervous and Mental Disease Monograph Series, issued under the general editorship of Drs. Smith Ely Jelliffe and Wm. A. White by the Journal of Nervous and Mental Disease Publishing Company, New York.

Studies in Psychiatry.—The Psychiatric Society of New York was founded in 1903 on semi-private lines, the meetings, at which original papers are read and discussions carried on, being held quarterly at the invitation of individual members. On pages 209-211 is given a list of the subjects of the forty papers and discussions of the society from its commencement in April 1903 to November 1910. Many of the contributions have already been published in the journals, but they have not been collected in permanent form. This is the first volume of selected papers of the society, and others are promised from time to time. The papers, fifteen in number, cover a variety of subjects, and all are interesting and valuable contributions to the literature of

psychiatry. The first and second papers, on "The Insane in Japan" and "A Study in Race Psychopathology," will appeal to the psychiatrist who is specially interested in comparative psychology and anthropology, the latter paper showing the incidence of the characteristic types of mental disorder occurring amongst American (United States), English, Irish, German, Italian, Jewish, and Negro patients admitted during a year to Manhattan State Hospital. Two papers follow on the "Diagnosis and Curability of General Paresis," and two on "Alcoholic and Drug Psychoses." Four papers deal with the deterioration psychoses, or dementia præcox group, including the constitutional factor or "mental make-up," and their relationships to hysteria, neurasthenia, psychasthenia, and alcoholic insanity. Three papers deal with the eye changes in insanity, more particularly in dementia præcox; and one paper deals with cyclothymia, or the mild forms of manic-depressive psychoses, and the underlying constitutional factor. This volume can be heartily commended to the serious study of every psychiatrist.

The *Handbook of Mental Examination Methods* is a useful epitome of the various procedures of the experimental psychologist which have given the best practical results in the clinical and laboratory investigation of sensation, movement, attention, perception, memory, association, and mental processes generally. These methods are of limited application amongst the insane, but the author has done a good piece of work in indicating those which are of most use to the psychiatrist, and to be employed as a rule only for the special investigation of suitable cases.

X-Ray Diagnosis and Treatment. By W. J. S. BYTHELL and A. E. BARCLAY. Pp. 140. London: Oxford University Press. 1912. Price 15s.

DRS. BYTHELL AND BARCLAY have accomplished a very difficult task in the production of a book on X-ray diagnosis and treatment which is at once suitable for the general practitioner, the medical and surgical consultant, and the radiographer. It condenses much valuable matter into a comparatively small space, embracing, as it does within its 140 pages, most of the present-day information regarding the clinical use of X-rays. The medical student has not sufficient time during his curriculum for the study of X-rays, with the result that the general practitioner is unaware of the extent of useful information within his reach. This small volume succinctly sets forth the diagnostic possibilities of X-rays, with an absence of electrical technicalities which will appeal to its readers.

The chapters on diseases and injuries of bones and joints might profitably have been enlarged. The plates are well selected and beautifully reproduced. The table of dates of appearance and union of epiphyses, although useful, must not be taken too literally.

Radiography of the urinary tract is very fully dealt with in Chapter IX. The ideals, however, are not so easy of attainment as the authors would lead us to believe, and the statement that "even in stout patients it is now easy as a rule to show clearly the outlines of the kidneys upon the plate" must be taken with some reserve. Chapter VII is devoted to X-ray examination of the thorax. Radioscopy combined with radiography is advocated, and although the chapter is a short one, it shows to advantage the importance of an X-ray examination in all but the simplest cases of intra-thoracic lesion. Chapter VIII, on examination of the abdomen is perhaps the best chapter in the book. It is a clearly-expressed epitome of available information, combined with personal observation regarding the mechanics of the alimentary canal. Here, again, it is pointed out that radiography only really gives us information as to the state of affairs at the moment of exposure, whereas radioscopy enables us to watch the process of peristalsis, etc.

A guide to the present-day attainments of radio-therapy is given in the last chapter.

BOOKS RECEIVED.

- ASHTON, W. E. A Text-Book on the Practice of Gynecology. Fifth Edition. (W. B. Saunders Co.) 27s. 6d.
 BEGGS, S. T. Guide to Promotion for Non-Commissioned Officers and Men of the Royal Army Medical Corps. Third Edition. (Gale & Polden, Ltd.) 3s. 6d.
 BIEDL, Artur. The Internal Secretory Organs: Their Physiology and Pathology (Bale, Sons & Danielsson) 21s.
 CAVE, M. H. First Steps to Nursing (Partridge & Co.) 1s.
 CHILD, R. W. The Blue Wall (Constable & Co.) 6s.
 CUNNINGHAM, D. J. Manual of Practical Anatomy. Vol. II. Fifth Edition (Frowde, Hodder & Stoughton) 10s. 6d.
 DAVIDSON, H. S. Marriage and Motherhood (T. C. & E. C. Jack) 6d.
 FRASER, E. T. A Manual of Immunity (Maclehose & Sons) 5s.
 HARE, F. On Alcoholism: Its Clinical Aspects and Treatment. (J. & A. Churchill) —
 HAWTHORNE, C. O. Forensic Medicine and Toxicology. Third Edition (Edward Arnold) 6s.
 HIRST, B. C. A Text-Book of Obstetrics. Seventh Edition (W. B. Saunders Co.) 21s.
 HUTCHISON, A. M. Hypnotism and Self-Education (T. C. & E. C. Jack) 6d.
 JORDAN, E. O. A Text-Book of General Bacteriology. Third Edition (W. B. Saunders Co.) 13s.
 KRAUSE, F. Surgery of the Brain and Spinal Cord. Vols. II. and III. (H. K. Lewis) £3
 LEGGE, T. M., and K. W. GOADBY. Lead Poisoning and Lead Absorption. (Edward Arnold) 12s. 6d.
 MERCK'S Annual Report of Recent Advances in Pharmaceutical Chemistry and Therapeutics, 1911. Vol. XXV. 1s. 6d.
 ROLLESTON, H. D. Diseases of the Liver, Gall-Bladder, and Bile-Ducts. (Macmillan & Co.) 25s.
 SCHAFER, E. A. Experimental Physiology (Longmans, Green & Co.) 4s. 6d.
 SEMON, R. Das Problem der Vererbung "Erworbener Eigenschaften" (Engelmann, Leipzig) M.3.20
 STILES, P. G. Nutritional Physiology (W. B. Saunders Co.) 6s.
 THE Baby. By a University Woman (T. C. & E. C. Jack) 6d.
 THE Ship Captain's Medical Guide. Fifteenth Edition. Edited by C. Burland (Darling & Son) 2s.
 UNDERWOOD, A. S., and B. A Handbook on Surgery for Dental Students (Bale, Sons & Danielsson) 3s. 6d.
 VINCENT, R. The Nutrition of the Infant. Fourth Edition (Baillière, Tindall & Cox) 10s. 6d.
 WARING, H. J. Manual of Operative Surgery. Fourth Edition (Frowde, Hodder & Stoughton) 12s. 6d.
 WOODWARD, A. S. Manual of Medicine Frowde, Hodder & Stoughton) 10s. 6d.

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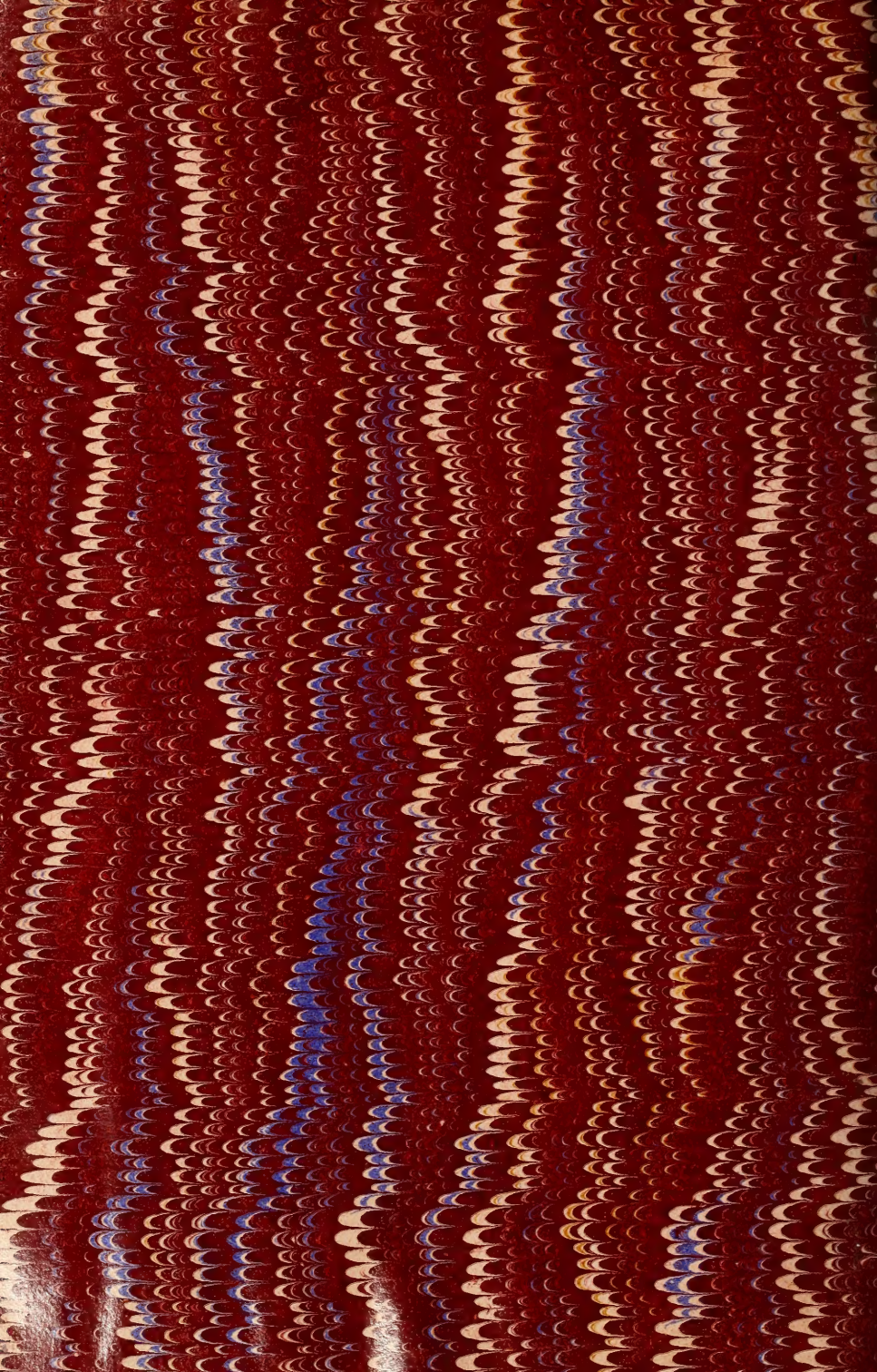
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